PB-230 574

WATER-ORIENTED OUTDOOR RECREATION IN THE LAKE MICHIGAN BASIN - ILLINOIS, WISCONSIN, MICHIGAN, INDIANA

Bureau of Outdoor Recreation
Ann Arbor, Michigan

1967

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WATER-ORIENTED OUTDOOR RECREATION
in the
LAKE MICHIGAN BASIN

Illinois - Wisconsin - Michigan - Indiana

Prepared for

Federal Water Pollution Control Administration*
Great Lakes Region
Chicago, Illinois

By

Bureau of Outdoor Recreation
Lake Central Region
Ann Arbor, Michigan

UNITED STATES DEPARTMENT OF THE INTERIOR

1965
(Reprinted, 1967)

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*Successor to the Division of Water Supply and Pollution Control,
Public Health Service,
U. S. Department of Health, Education, and Welfare.

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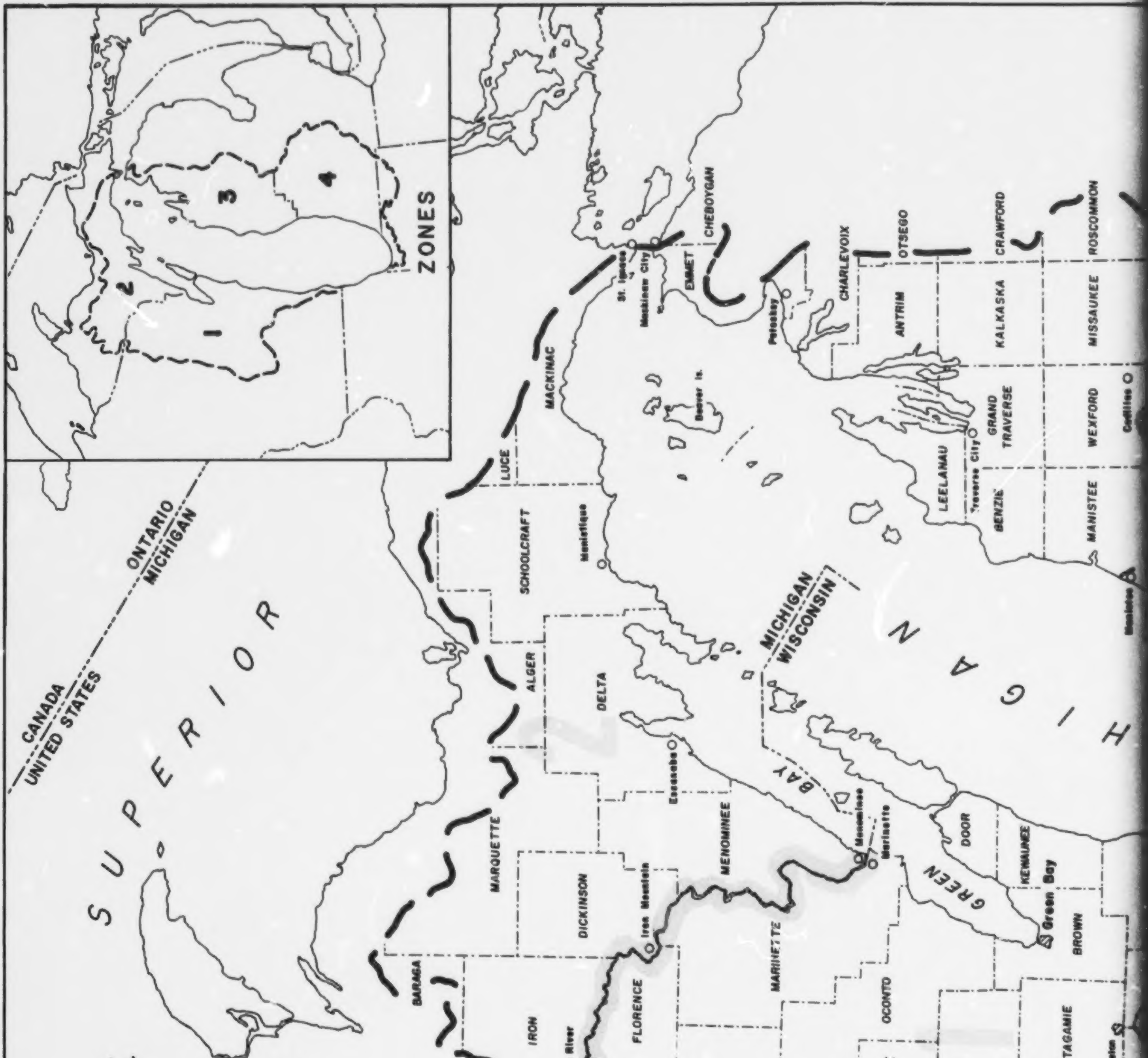
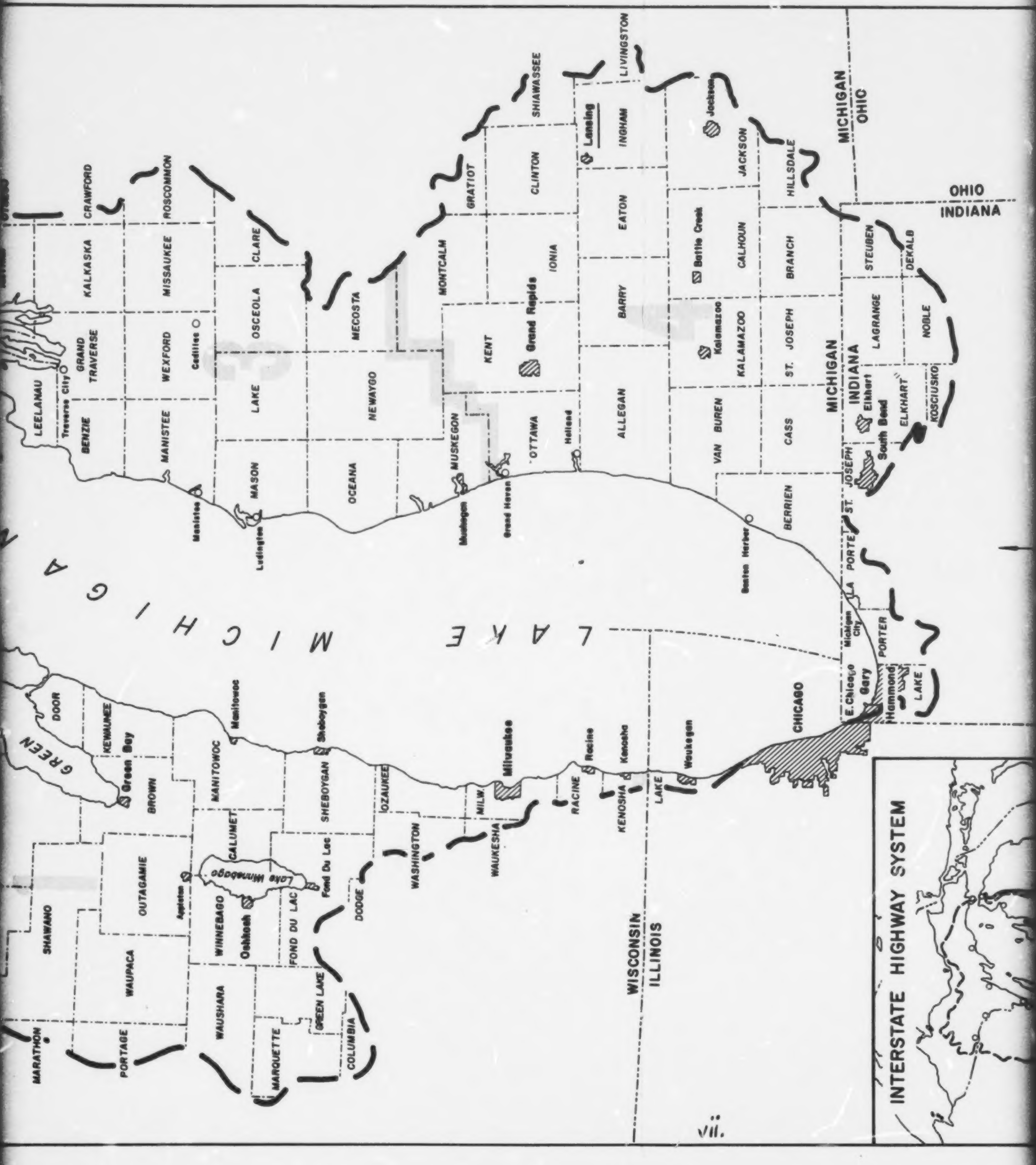

ZONES
1
2
3
4
CANADA
UNITED STATES
ONTARIO
MICHIGAN
LAKE SUPERIOR
MINNESOTA
MICHIGAN
MICHIGAN
WISCONSIN
MICHIGAN
WISCONSIN
BARAGA
MARQUETTE
ALGER
SCHOOLCRAFT
LUCE
MACKINAC
DELTA
MENOMINEE
DICKINSON
IRON
GOGEBIC
VILAS
ONEIDA
FOREST
FLORENCE
MARINETTE
LANGLADE
OCONTO
MENOMINEE
SHAWANO
MARATHON
PORTAGE
WAUPACA
OUTAGAMIE
BROWN
KEWAUNEE
DOOR
GREEN BAY
EMMET
CHEBOYGAN
CHARLEVOIX
OTSEGO
ANTRIM
KALKASKA
CRAWFORD
ROSCOMMON
MISSAUKEE
WEXFORD
GRAND TRAVERSE
LEELANAU
BENZIE
MANISTEE
HIGAN
St. Ignace
Mackinaw City
Petoskey
Beaver Is.
Traverse City
Cadillac
Manistique
Escanaba
Menominee
Marinette
Iron Mountain
Iron River
Green Bay
Appleton
Manistee


LAKE MICHIGAN
GREEN BAY
Green Bay
Manitowoc
Sheboygan
Milwaukee
Racine
Kenosha
Waukegan
CHICAGO
E. Chicago
Gary
Hammond
Michigan City
Benton Harbor
South Bend
Elkhart
Kalamazoo
Battle Creek
Jackson
Lansing
Grand Rapids
Holland
Grand Haven
Muskegon
Ludington
Manistee
Cadillac
Traverse City
Appleton
Oshkosh
Fond Du Lac
Lake Winnebago
WISCONSIN
ILLINOIS
MICHIGAN
INDIANA
OHIO
DOOR
KEWAUNEE
BROWN
MANITOWOC
CALUMET
SHEBOYGAN
OZAUKEE
WASHINGTON
MILW.
WAUKESHA
RACINE
KENOSHA
LAKE
FOND DU LAC
DODGE
GREEN LAKE
COLUMBIA
MARQUETTE
WAUSHARA
WINNEBAGO
OUTAGAMIE
SHAWANO
WAUPACA
PORTAGE
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LEELANAU
BENZIE
GRAND TRAVERSE
KALKASKA
CRAWFORD
MANISTEE
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MISSAUKEE
ROSCOMMON
MASON
LAKE
OSCEOLA
CLARE
OCEANA
NEWAYGO
MECOSTA
MUSKEGON
MONTCALM
GRATIOT
OTTAWA
KENT
IONIA
CLINTON
SHIAWASSEE
ALLEGAN
BARRY
EATON
INGHAM
LIVINGSTON
VAN BUREN
KALAMAZOO
CALHOUN
JACKSON
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BRANCH
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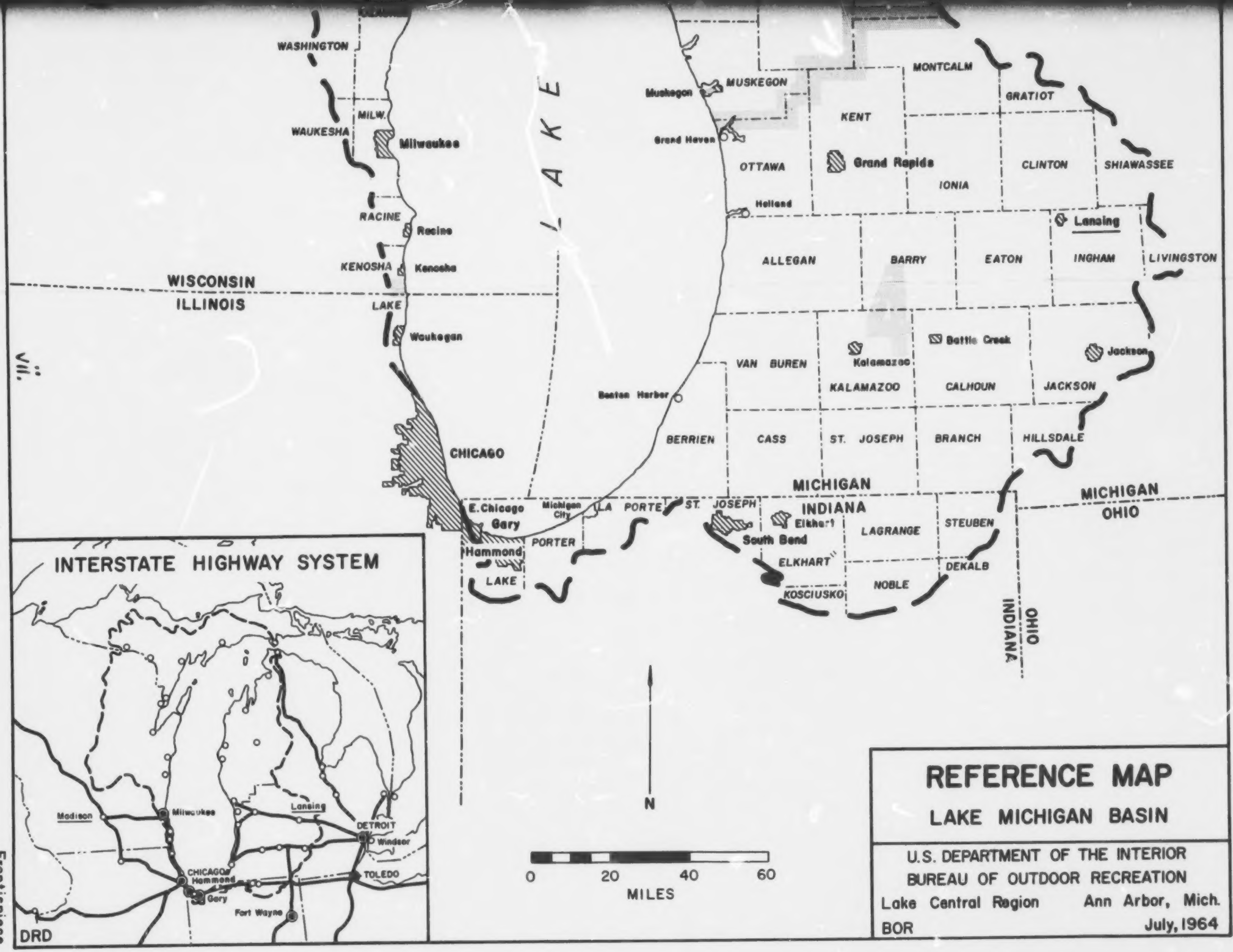
LAKE
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OTTAWA
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Grand Rapids
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GRATIOT
CLINTON
SHIAWASSEE
Lansing
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BARRY
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Milwaukee
Lansing
DETROIT
Windsor
CHICAGO
Hammond
Gary
TOLEDO
Fort Wayne
DRD

REFERENCE MAP
LAKE MICHIGAN BASIN

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF OUTDOOR RECREATION
Lake Central Region Ann Arbor, Mich.
BOR July, 1964

Frontispiece

INTRODUCTION

Authorization

The survey of the outdoor recreation resources in the Lake Michigan Basin was prepared by the Lake Central Region, Bureau of Outdoor Recreation, Department of the Interior, at the request of William Q. Kehr, Project Director, Great Lakes-Illinois River Basins Project, Region V, Public Health Service, Department of Health, Education and Welfare, by letter of July 15, 1963. The Bureau of Outdoor Recreation made the study under basic authorization contained in Public Law 88-29, 88th Congress, enacted May 28, 1963.

Purpose

The purpose of the study is to: (1) inventory existing recreation areas and facilities within the Basin with particular emphasis on water-oriented recreation; (2) establish needs and goals for lands for recreational development to the year 2010; (3) identify potential recreation areas; (4) determine water quality influence on present and future outdoor recreation activities; and (5) recommend actions or programs to improve the Basin's water recreation opportunities both now and in the future.

The accomplishment of the above purpose will emphasize the urgent need for measures to prevent and control water quality degradation in present and potential recreation areas. It will also point to the mounting necessity of establishing ways and means of relating water quality to a satisfactory recreation experience.

Scope

This report will only consider recreation areas within the watershed boundary. A zone of influence, as such, was not adopted for the following reasons: (1) much of the area that would be considered a zone of influence will be studied in subsequent studies on Lake Superior, Lake Huron, Lake Ontario, and Lake Erie; and (2) it was found that so many additional recreation areas would need to be considered that valuable time and space would be required at the expense of Basin Area evaluation. Though a zone of influence was not adopted, the influence of people outside of the basin on recreation demand within the basin was considered. Outside influence was represented through calculation of the influence of the population of SMSA's within a 125 mile radius of the basin on the recreation demand in it.

An inventory of recreation areas administered by the Federal Government, the various state agencies, county, township and city governments is herein contained. It is as complete as practicable in terms of the purpose of the study. The emphasis is placed on non-urban recreation areas such as public camping areas, public beaches, the larger marinas on Lake Michigan, ski resorts, and private campgrounds collectively by counties, but no attempt is made to evaluate such urban recreation outlets as swimming pools, golf courses, children's playgrounds, amusement parks, city parks that do not provide facilities for camping, or water-oriented recreation. An estimation is made of present use. Projected use is estimated by considering existing, proposed, and potential area development and their capacity to satisfy a projected demand. In certain areas where low water quality has had significant impact to limit recreation use, an estimation of influence is made.

Problems and Limitations

By using a watershed boundary as the limit of measurement, it was found that much interpolating was necessary as most existing data is on a state or county basis.

There are no commonly agreed upon standards and criteria to employ in assessing the adequacy of recreation facilities either as to quantity or quality. Water quality standards, as they apply to recreation, vary considerably between agencies responsible for determining whether certain types of water-oriented recreation will be permitted. Some beaches are permitted to remain open though the water quality may be lower than that at other beaches which have been closed by another agency.

Estimating future recreation demand or use was particularly vexing because desired statistical information was lacking or incomplete. It was necessary therefore to use weighted judgments in the absence of such desired statistical information. Such judgments were based on secondary data when possible.

SUMMARY

Water is a major focal point for outdoor recreation activities. Most people seek water in which to swim or fish, on which to boat, beside which to camp, picnic and walk; or just to look at. The Basin's 1,300 miles of Lake Michigan recreational shoreline, 8,000 inland lakes and thousands of miles of river and stream banks combine to form a magnet which from the past to the present day continues to draw people seeking a pleasant recreational experience. Two factors appear to have a paramount effect on the recreational use of the Basin's waters. These are: (1) the quality and (2) the availability of the waters for use by the public. Hence, though the Basin is well endowed with the natural resources required to meet the water-oriented recreational needs of the Basin residents and those of the large metropolitan areas to the south, deteriorating water quality and other competitive uses of the resource are eroding away the portion of it available for recreational pursuits.

Eighty percent of the people who participate in recreation in the Lake Michigan Basin originate in the five states of Wisconsin, Michigan, Illinois, Indiana and Ohio. These states had a 1960 population in excess of 36 million. It is expected to more than double by the year 2010. Thus there is a tremendous base for recreational demand in the Basin. There is presently a considerable shortage of recreational opportunities in the southern portion of the Basin. This study indicates the current need for development of day-use type facilities to be about 63,000 acres, most of which is in the lower half of the Basin. Action must not be delayed in order to assure the proper protection and development of such facilities as the projected need for them will grow to 244,000 acres by 2010. Acres alone do not tell the full story. The level of development is equally if not more important. Each acre of available land and water must be put to its best outdoor recreational use. Multiple use of water and associated land areas in public ownership will be necessary. Private recreational developments open to the public must be encouraged.

The limitations placed on recreation by water quality will vary depending on the type of water-oriented recreation to be engaged in. Swimming and other activities requiring complete body contact with the water demand the highest quality. Deterioration of water quality in portions of the Basin due to over-nutrification of many inland lakes and even portions of Lake Michigan has increased the production of planktonic algae, Cladophora and other aquatic vegetation to the point that many of the recreational values have been destroyed. In addition, an important aspect of the recreational value of water, i.e., its aesthetic appeal, has been devalued in some locations. The most notable causes of pollution affecting recreational waters are effluents from municipal and industrial sewage disposal facilities. Beside the possible introduction of pathogens and toxic wastes, such effluents enrich the waters causing luxuriant algal and aquatic vegetative growth which turn swimmers green, foul motor boat propellers, and entangle fishing lures. Soil erosion, water enrichment from farm chemicals and construction of impoundments have also caused changes in water quality and hence affected recreational use of Basin waters. One aspect of pollution often overlooked by the recreationists is the effect they themselves and their activities have on the quality of recreational waters and associated land areas. A particularly vexing problem is that presented by the summer homes and cottages in the Basin which number between 70,000 and 80,000. Many are located in areas remote from adequate sewage treatment facilities. Pollution by seepage from septic tanks, overflow of drainage fields and in some instances, direct discharge of sewage into recreational waters from individual homes results in over-fertilization. Pleasure boating has also caused water quality problems in local areas principally through the discharge of sewage in anchorage areas. Winter sports activities, particularly ice fishing, have created situations detrimental to water quality through the deposition of debris on the ice and snow. As interest in winter sports activities increases, they may cause more acute problems in the future. From the recreational standpoint, it was concluded, the place to begin the improvement of water quality in recreational areas is through education of the recreationists themselves.

Availability, the second factor affecting recreational use of waters, has two facets. First, the larger portion of the natural resources available for recreation are located in the northern half of the Basin away from the metropolitan areas where the need for them is greatest. Transportation systems are being continually improved and thus it is reasonable to assume they will become more readily available in the future. As an example, the completion of a four lane highway the length of Michigan's Lower Peninsula has enhanced recreational opportunity in that state. Second, though the Basin's resources are becoming more easily accessible, public use of them is becoming more restricted through private development and use for competing purposes. Access has become a steadily increasing problem since the late 1940's as our expanding population has put more and more pressure on the land and water areas. Private owners, meanwhile, have increased their resistance to indiscriminate use of their land and water areas by others. One exception to this trend occurs in large industrial ownerships which have tended toward permitting public use of their lands. Such permission varies from acts promoting use to tacit approval of use. To further encourage public use of industrial lands for recreational purposes, revision of ownership liability laws is needed.

The inventory of recreational facilities accompanying the study revealed the existence of more than 600 publicly owned areas within the Basin on which recreational facilities have been developed. Eighty-six percent of these areas have water-oriented recreational facilities. Though more than 100 proposed and potential areas were identified, the addition of them to the areas presently existing will not meet the future demands which will exceed a quarter of a billion activity days of water-oriented recreation by the year 2010.

To meet the recreational needs of the Basin these goals must be achieved:

1) acquisition and development of adequate suitable recreation facilities within reasonable distances of those who would use them.

2) reduction of present pollution and prevention of further pollution of recreational waters and

3) proper zoning and planned development of lands within and adjacent to recreational areas.

Each State agency concerned has, or is developing, plans to meet these goals. The Federal Government has several programs and agencies concerned with acquisition and development of recreational lands. Of major importance among these is the Land and Water Conservation Fund Act administered by the Bureau of Outdoor Recreation. Private enterprise will also play an important part in meeting the increasing recreational needs of the Basin, through the development of additional campgrounds, marinas, vacation farms and recreational facilities on industrial forests. Continual revision, expansion and updating of plans and programs will be necessary if the challenge posed by the great surge of interest in outdoor recreational activities in the Basin is to be met.

PHYSICAL ASPECTS OF THE BASIN

Location and Extent

The study area begins just north of Chicago, extends north through Wisconsin and Michigan's Upper Peninsula to the Straits of Mackinac, the outlet of Lake Michigan, then south through Michigan and northeastern Indiana to a point just east of Chicago. The study area includes all the area tributary to Lake Michigan except in the Chicago area where only the shoreline is considered to be in the Basin.

The study area is approximately 350 miles north and south and about 270 miles wide and includes parts of four states: Michigan, Wisconsin, Indiana, and about 100 square miles in extreme northeastern Illinois. The land area tributary to the Lake is about 45,500 square miles, 64 percent of which is in Michigan, 31 percent in Wisconsin and 5 percent in Indiana. Illinois contributes less than two-tenths of a percent to the land area of the basin. About 50 percent of the State of Michigan drains into the Lake; about 25 percent of Wisconsin and about seven percent of Indiana. Table No. 1 displays the breakdown of areas within the Basin.

For purposes of this study, the Lake Michigan Basin was divided into four zones and their boundaries were established by political, geographical, and land-use lines. The relative locations of the zones are indicated on the frontispiece. Beginning at the Illinois-Wisconsin state line, Zone 1 is considered to be that portion of Wisconsin that drains into Lake Michigan. Zone 2 is the Upper Peninsula portion of Michigan which drains into the Lake. Zone 3 is the upper half of the Lower Peninsula of Michigan which substantially divides the recreational part from the agricultural and industrial lower half. Zone 3 includes Muskegon, Newaygo and Mecosta Counties but terminates at their southern county lines. Zone 4 is the remainder of Michigan and that portion of Indiana which drains into Lake Michigan.

Although the Illinois shore of Lake Michigan was considered in the report "Water Oriented Outdoor Recreation in the Illinois River Basin," lake front recreation facilities of it, the Chicago metropolitan area, are also considered in this report.

The Climate

The climate of the Lake Michigan Basin is influenced by the waters of the Great Lakes. The large expanses of water temper the prevailing winds and tend to make the area a climatic island in the

Table No. 1

THE LAKE MICHIGAN BASIN

TOTAL BASIN AREA (land and water)	67,900 square miles
LAKE MICHIGAN WATER AREA	22,400 square miles
INLAND LAKE AREA	1,060 square miles
BASIN LAND AREA	44,440 square miles

BASIN LAND AREA BREAKDOWN BY STATES

State	State Area (Sq. Miles)	Area of State in Basin	Percent of State in Basin	Percent of Basin in State
MICHIGAN	58,200	29,000	50.0	63.8
WISCONSIN	57,500	14,000	24.0	30.7
INDIANA	36,185	2,400	7.0	5.3
ILLINOIS	55,930	100+	0.2	0.2
TOTAL	207,815	45,500		100.0

northern Midwest. The shoreline recreation climate is shown graphically in Figures No. 1 and 2.

Outstanding beneficiaries of the climatic largess are the counties of Michigan's Lower Peninsula that lie along the Lake Michigan coast. The prevailing westerly winds, tempered in passage over the Lake, blow cool in summer, thus providing an escape from summer heat for the residents and tourists.

The deeper waters of the Lake remain near 39°F and consequently yield heat to the prevailing westerly winds in winter. This warmth brings heavy snows to Michigan and makes excessively low land temperatures rare.

FIGURE NO. I

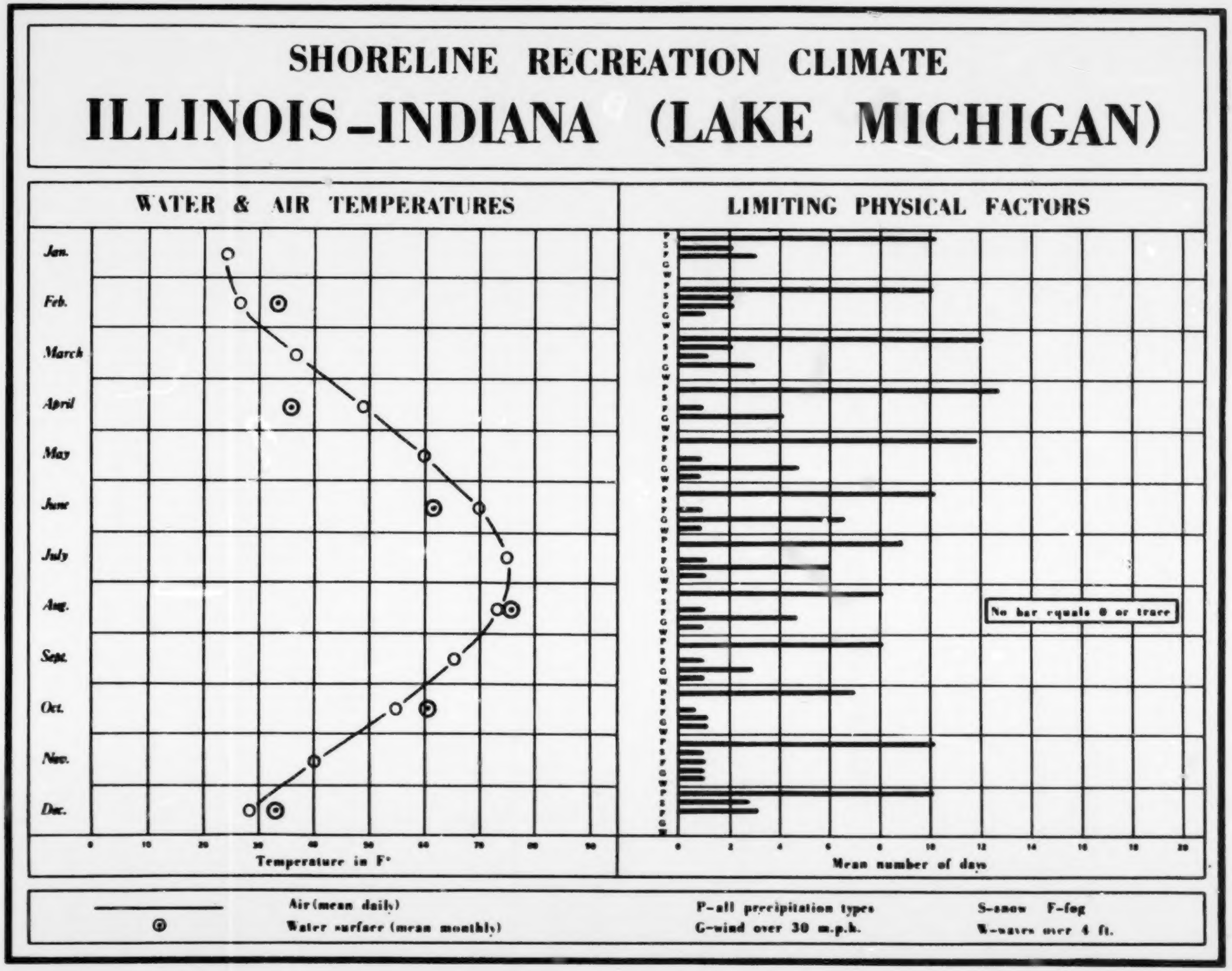
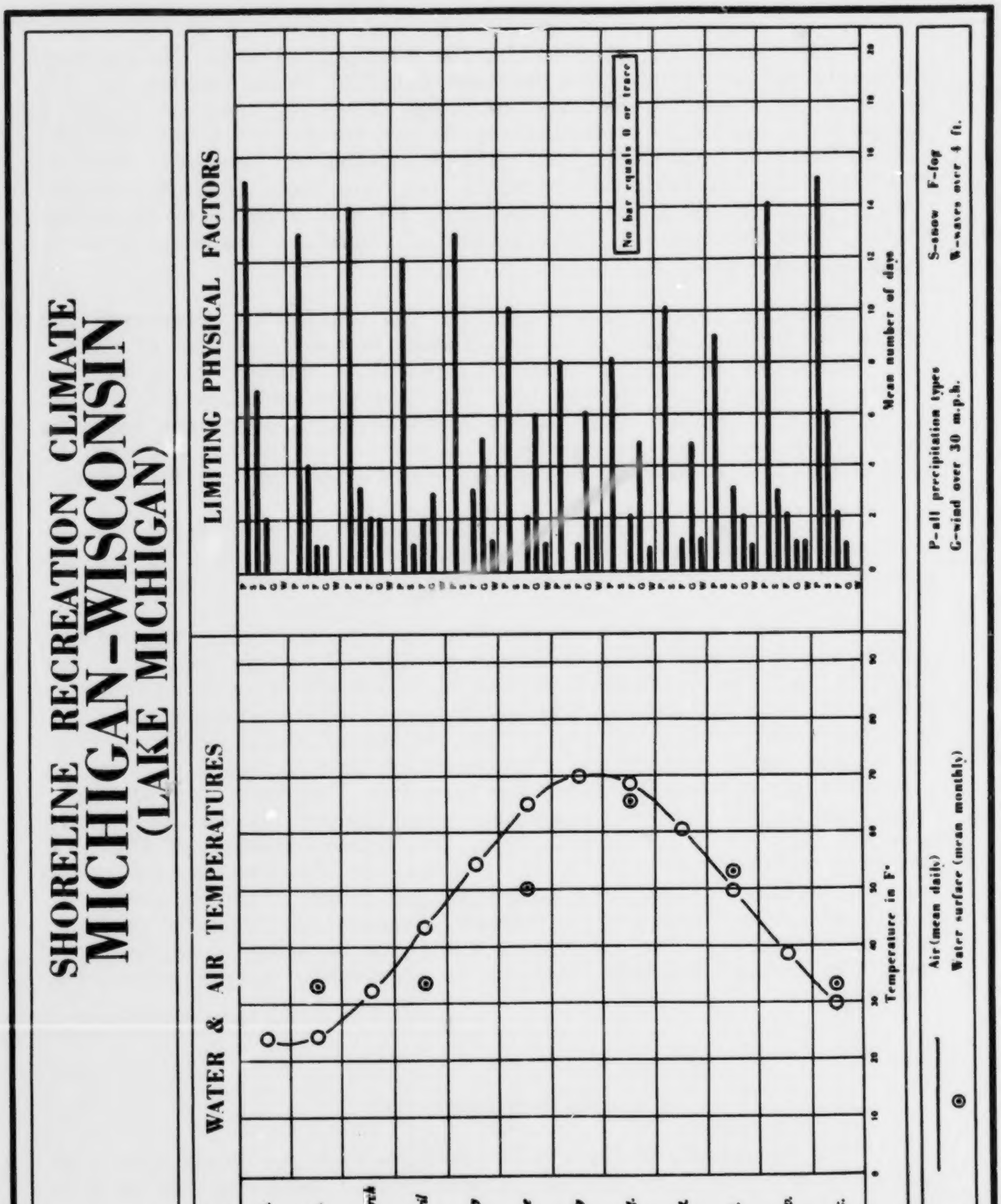

SHORELINE RECREATION CLIMATE
ILLINOIS-INDIANA (LAKE MICHIGAN)
WATER & AIR TEMPERATURES
LIMITING PHYSICAL FACTORS
Jan.
Feb.
March
April
May
June
July
Aug.
Sept.
Oct.
Nov.
Dec.
0
10
20
30
40
50
60
70
80
90
Temperature in F°
0
2
4
6
8
10
12
14
16
18
20
Mean number of days
P
S
G
F
W
No bar equals 0 or trace
Air (mean daily)
Water surface (mean monthly)
P-all precipitation types
G-wind over 30 m.p.h.
S-snow F-fog
W-waves over 4 ft.

FIGURE NO. 2


SHORELINE RECREATION CLIMATE
MICHIGAN-WISCONSIN
(LAKE MICHIGAN)
WATER & AIR TEMPERATURES
LIMITING PHYSICAL FACTORS
Jan.
Feb.
March
April
May
June
July
Aug.
Sept.
Oct.
Nov.
Dec.
0
10
20
30
40
50
60
70
80
90
Temperature in F°
0
2
4
6
8
10
12
14
16
18
20
Mean number of days
No bar equals 0 or trace
Air (mean daily)
Water surface (mean monthly)
P-all precipitation types
S-snow
F-fog
G-wind over 30 m.p.h.
W-waves over 4 ft.

The average annual rainfall for Michigan is about 30.4 inches. In nearly all sections, the heaviest rainfall comes between May and October. As a result, periods of high humidity are not uncommon during this period. Approximately 20 percent of the total precipitation falls as snow during the winter months of December through February. The variation in snowfall over the state is wide, ranging from as much as 160 inches in the Upper Peninsula to about 30 inches in the Lower Peninsula. Distribution of snowfall is shown graphically on Plate No. 23.

The climate of the portion of the Basin in Wisconsin is influenced by the Great Lakes to a lesser degree than that of Michigan. Wisconsin temperatures are, in general, colder in winter and warmer in summer than Michigan's. The average annual precipitation in Wisconsin ranges from about 26 inches in the extreme north to about 34 inches along the southern border. The state average is 30.6 inches. The heaviest rainfall comes between May and September.

The greatest amount of snowfall occurs in the far north where some sections average 55 to 60 inches. In the extreme south the average snowfall is about 30 inches.

The general climate of the Basin could then be considered air-conditioned and thermostatically controlled by the waters of the Great Lakes. The weather is favorable to summer recreation activity during the season from May through October. Winter temperatures and snowfall conditions make the major portion of the Basin desirable for winter sport activities from December through March. Shore ice prohibits shore use of much of the Lake from December through early April due to the buildup of unstable ice fields. In certain areas, however, such as in protected bays, the winter freeze of the Lake provides an opportunity for such activity as ice fishing, ice boating and skating. Along the Lake Michigan shore, swimming and water skiing are feasible during midsummer, especially along the southern half of the Lake. Fog and storms are to be expected throughout the year, but are not frequent enough to seriously hamper recreation activity.

The Land

Geography and Topography

The topography and soils of the Lake Michigan Basin have been generally determined by several glaciations, resulting in much of the land being rolling to hilly. The northern portion of the Basin contrasts sharply with the southern part in several respects. The areas to the north are generally higher in elevation with rugged topography and extensive forests. An exception occurs in the eastern Upper Peninsula of Michigan where large areas of swampland exist. The only prominent hill areas in the southern portion of the Basin are located in the glacial moraine extending from the Door Peninsula of Wisconsin to Walworth County and in the moraine forming the eastern boundary of the Basin in Michigan. In the remaining southern areas the Basin is rolling with less prominent glacial features. Also significant in the topography are the areas of extensive sand dunes located for the most part along the shore of Michigan's Lower Peninsula.

An area of former lake bed extends into the Indiana portion of the Basin with rather flat land predominating. Immediately at the Lake shore is a large expanse of sand dunes.

Land Use

Land use in the Lake Michigan Basin ranges from the very intensive to the very extensive. This pattern is apparent as one travels from south to north on either side of the Lake. Urban and industrial land in the southern part of the Basin make up about ten percent of the land area. Areas of intensive agriculture exist around these urbanized areas and extend northward to the point where unfavorable soil conditions force the transition to more extensive use. Intensive agriculture gives way to dairy farming, interspersed with forestry operations, as one proceeds north in the Basin. This mixture in turn gives way to nearly exclusive forestry in the far northern portion of the Basin. Specialty crops of fruit appear on the Door Peninsula and along the shore of Michigan's Lower Peninsula. Table No. 2 depicts general land use within the Basin. Agricultural land use is illustrated on Plate No. 1.

Forest Cover

From north to south, the extent of land in forests decreases. Nearly 90 percent of the northern one-third is forested. The Upper Peninsula of Michigan and the northeastern section of Wisconsin are both covered extensively by northern hardwoods and conifers with aspen stands appearing in great numbers. Bogs are numerous, with thickets of blueberries, raspberries and blackberries prevalent. The northern Lower Peninsula of Michigan is also heavily forested -- about 70 percent -- with coniferous species and aspen dominating the landscape.

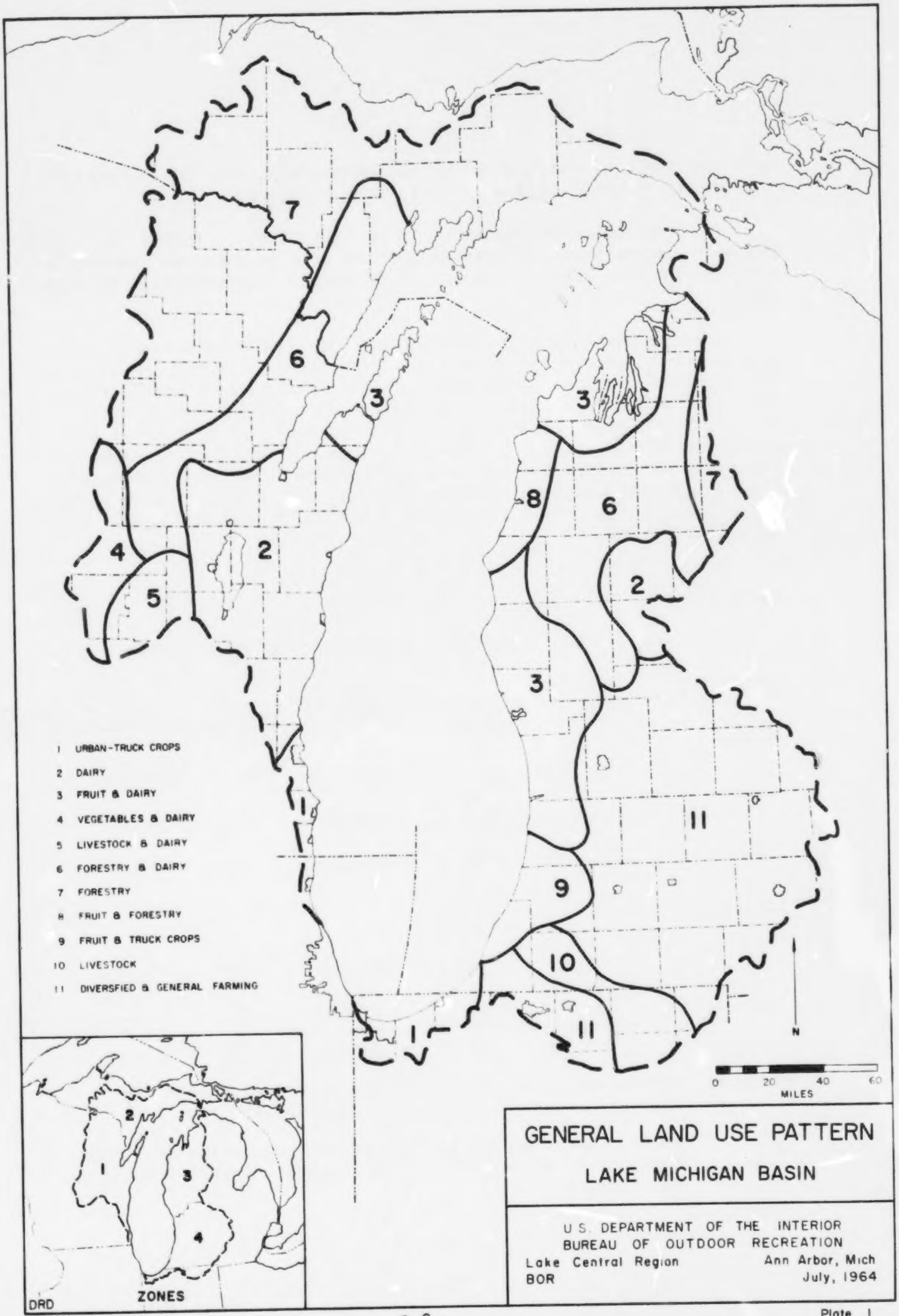
The southern sections of the Basin are primarily agricultural with only 10 to 17 percent left in forest land. Deciduous species

Table No. 2

LAND USE IN THE LAKE MICHIGAN BASIN

	MICHIGAN		WISCONSIN		INDIANA	
	Acreage	%	Acreage	%	Acreage	%
Agricultural Land						
Cropland	4,339,000	23.4	2,925,000	32.6	848,000	55.2
Pasture	1,176,000	6.3	876,000	9.8	180,000	11.7
Forest (Including Federal and State Lands)	8,115,000	43.7	3,549,000	39.6	163,000	10.6
Other	735,000	4.0	446,000	5.0	100,000	6.5
Water Area (Excluding Great Lakes)	392,000	2.1	283,000	3.2	22,000	1.4
Urban and Other Non-Agricultural Land	3,803,000	20.5	881,000	9.8	223,000	14.5
TOTALS	18,560,000	100.0	8,960,000	100.0	1,536,000	100.0

Source: Agriculture Census, 1959


1 URBAN-TRUCK CROPS
2 DAIRY
3 FRUIT & DAIRY
4 VEGETABLES & DAIRY
5 LIVESTOCK & DAIRY
6 FORESTRY & DAIRY
7 FORESTRY
8 FRUIT & FORESTRY
9 FRUIT & TRUCK CROPS
10 LIVESTOCK
11 DIVERSFIED & GENERAL FARMING
1
2
3
4
5
6
7
8
9
10
11
N
0
20
40
60
MILES
ZONES
DRD

GENERAL LAND USE PATTERN

LAKE MICHIGAN BASIN

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF OUTDOOR RECREATION
Lake Central Region Ann Arbor, Mich
BOR July, 1964

Plate 1

were the dominant original cover of these areas. Most of the remaining forest cover of this area is in farm woodland.

Since forest environment is a significant factor in the Basin's recreational attraction, it is well to consider ownership patterns as they give an indication of public accessibility to such lands.

Large portions of both Michigan and Wisconsin forest lands are in public ownership. The bulk of the public ownership lies in the northern parts of these states. About 40 percent of the forest land in the Upper Peninsula of Michigan is publicly owned, while in the northern Lower Peninsula, about 35 percent of the forest is in public ownership. The U. S. Forest Service and State of Michigan are the prime administrative agencies of Michigan forests. In Wisconsin, the U.S. Forest Service, various counties, and municipalities administer most of the public forests. Table No. 3 depicts forest land ownership by type.

Table No. 3

FOREST LAND OWNERSHIP PATTERNS IN THE LAKE MICHIGAN BASIN*

Ownership	Michigan		Wisconsin		Indiana	
	Acres	Percent	Acres	Percent	Acres	Percent
Private		(67.0)		(84.8)		(95.0)
Farm	1,631,000	20.1	2,243,000	60.9	117,000	72.0
Other (Except Industry)	2,597,000	32.0	648,000	17.6	38,000	23.0
Forest Industries	1,209,000	14.9	233,000[1]	6.3	---	---
Public		(33.0)		(15.2)		(05.0)
County and Municipal	41,000	0.5	203,000	5.5	6,000	3.7
State	1,566,000	19.3	96,000	2.6	2,000	1.3
Federal	1,071,000	13.2	263,000	7.1	---	---
Total	8,115,000		3,686,000		163,000	

*Source: Agricultural Census, Michigan's Forest Resources and Wisconsin Forest Inventory Publications.

[1] Acreage based on all private forest ownerships of 5,000 acres or more as indicated in Wisconsin Forest Inventory Publications.

The Federal lands of major significance for recreational purposes include parts of or all of four National Forests administered by the U. S. Forest Service and a National Wildlife Refuge administered by the U. S. Fish and Wildlife Service.

The four National Forests are the Nicolet in Wisconsin and the Hiawatha, Ottawa, and the western unit of the Huron-Manistee in Michigan. Federally owned land approximates 1,923,000 acres. These forests are non-contiguous due to many private inholdings.

The Seney National Wildlife Refuge contains 95,000 acres of land, lakes, and marshes in the Upper Peninsula of Michigan. The Federal areas are shown on Plate No. 6.

Wildlife

The wildlife of the Lake Michigan Basin is a significant recreation resource. Aside from its recreational value for hunting, which will be treated in the U. S. Fish and Wildlife Service Report on the Basin, it has a tremendous aesthetic appeal to those who recreate in the Basin. While few who come to the Basin actually see a bear, the excitement of being in an area where one may anticipate encountering them adds to the recreation experience. The more common wildlife of the region include deer, squirrel, raccoon, skunk, rabbit, porcupine, grouse, pheasant, and various species of waterfowl. Also within the Basin, more unusual species such as the Kirtlands Warbler, which has attracted national attention, are to be found.

Fish Life

The northern portion of the Basin has long been popular to those interested in fishing for recreation. Northern Pike, walleyes, largemouth bass, smallmouth bass, trout and muskellunge are sought after by the anglers in this region. In addition, perch, bluegill, crappie and various sunfishes are popular. Other common species include catfish, rock bass, white bass and the less desirable sheepshead, carp, bowfin and gar. Migrations and spawning runs of walleye, white bass, sturgeon, smelt and suckers provide seasonal recreation opportunities for fishermen in many tributary streams to Lake Michigan.

In Lake Michigan itself, fishing for lake trout, walleyes and white fish has been important in the past both from a sport and commercial fishing standpoint. With the invasion of the sea lamprey and, more recently, the alewife into the Lake, fish populations have undergone some major changes. These factors and the efforts made to manage fish resources are explored in detail in the U. S. Fish and Wildlife Service report on the Lake Michigan Basin. Such changes in the fish fauna of the Lake have had important influences on recreation within the Basin, the effect of dead alewife fouling swimming beaches around the south end of the Lake being a notable example.

Lake Michigan and Its Shoreline

Second largest of the Great Lakes, Lake Michigan is 22,400 square miles in size and the only Great Lake wholly within the United States. Consequently, it has the longest shoreline entirely within the United States of any of the Great Lakes. With its numerous islands, peninsulas, and bays, the total shoreline is 1,661 miles. About 1,300 miles of this distance is considered suitable for recreation. The Lake trends north and south and its 300 mile length reaches from the heavily populated, agricultural and industrial southern Great Lakes Region to the sparsely populated northern forest of the Upper Peninsula. Although, there are no tides on Lake Michigan, there are short-term changes in the Lake level caused by seiches. These surface oscillations, which occur within a given time period, may be compared to water sloshing back and forth in a bathtub. The duration of seiches varies from a few minutes to several hours. They are caused by the wind blowing in a specific direction for a long period of time or by a difference in barometric pressure. In either case, the water is forced from one end of the Lake and piled up on the other. Once the wind stops blowing or the pressure changes, the water oscillates back and forth across the Lake thereby causing an alternating rise and fall of levels at the Lake ends. With each swing there is a little less rise or fall until the Lake returns to normal. 1/

A seiche wave, which is a gradual rising or lowering of the water, may be observed more readily by watching the water level around piling, a dock, or pier. Occasionally these waves account for a sudden change in Lake level. At least seven lives were lost in Chicago in 1954 when just such a wave caught many people on a pier.

In addition to the seiches there are sizable variations in Lake level over periods of several years which are troublesome and a major consideration in recreational development of the shore. Erosion is an important factor during periods of high Lake level along the bluff portion of the shore. See Figure No. 3 which depicts problems encountered during high water in 1952. During periods of low

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1/ "Michigan and the Great Lakes" by Michigan Water Resources Commission, Lansing, Michigan, Rev. 1963.

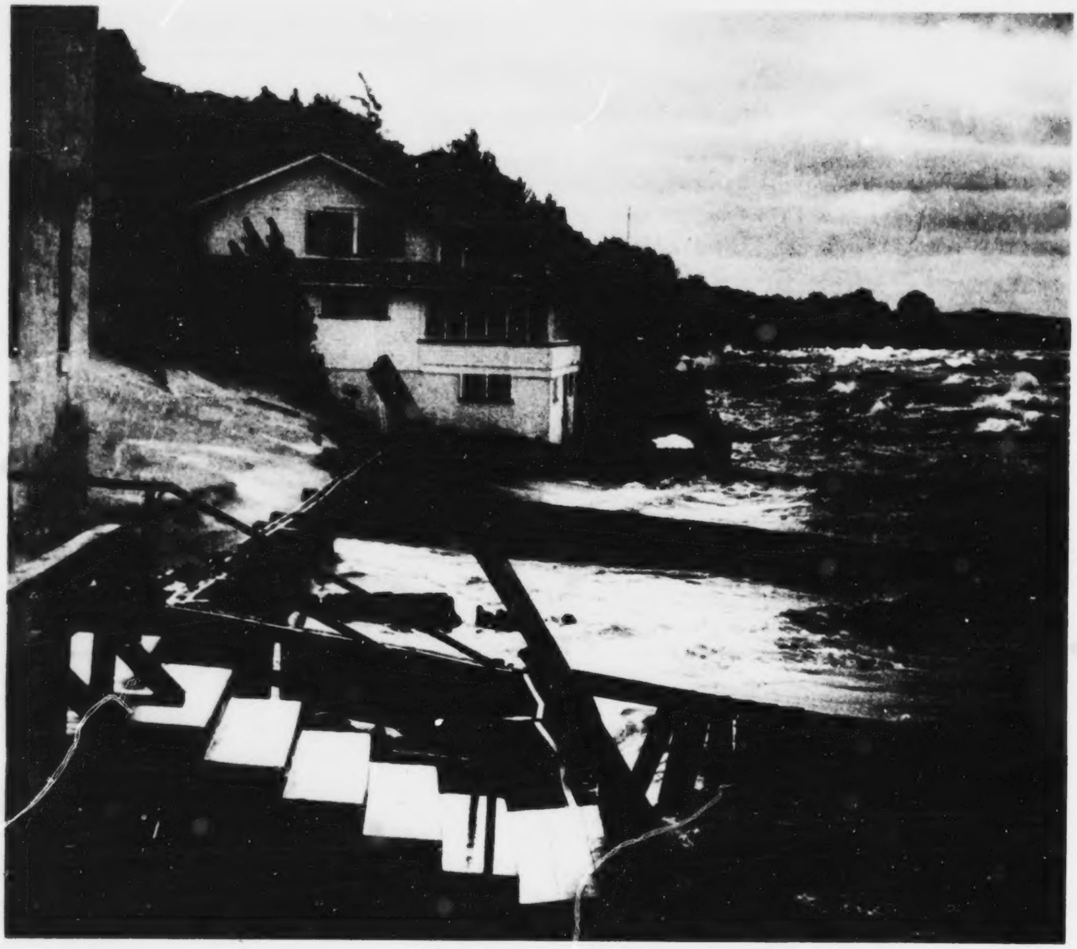

Figure No. 3 Effect of high water on summer homes along the Lake Michigan shore. Photo courtesy Michigan Water Resources Commission.

water such as existed during 1964, recreational boating was difficult in many areas due to sand bars and recession of water from mooring and launching facilities. See Figures No. 4 and 5 which depict low water conditions in 1964. Swimming areas are also affected by changes in the Lake level, many beaches becoming inundated during periods of high water, while others become shallow and unusable during periods of low water.

Shore ice prohibits use of the shore for about five months of each year except where ice fishing is possible in some protected bay areas.

The extent of the Lake Michigan recreation shoreline by type and state is shown in Table No. 4. This table and the following general description of the shoreline by states is consolidated from information contained in ORRRC Report No. 4. Recreation shoreline is defined in the ORRRC Report as meeting in some substantial degree all of the following criteria:

1. the existence of a marine climate and environment.
2. the existence of an expanse of view of at least five miles over water to the horizon from somewhere on the shore and
3. location on some water boundary of the U. S. (water bodies lying entirely within the U. S. are not included). (While Lake Michigan does not meet this criterion, it has been included nevertheless.)

The recreation shoreline of the Illinois portion of Lake Michigan is 45 miles in length. Public recreation areas are located on 24 miles or 53 percent of this shoreline which is generally a low bluff ranging from a few to almost 100 feet in height fronted by sand (or sand-gravel) beaches. The beaches and bluffs are the result of wave erosion since the glacial period. Artificial beaches, other filled areas, bulkheads, seawalls, and harbor areas are typical of the shore in the Chicago area.

The recreation shoreline of the Wisconsin portion of Lake Michigan is 409 miles long. Only 13 miles or three percent of this shoreline is in public recreation areas. The shoreline consists of moderately high bluffs, of old lake bed deposits or, infrequently, of rocky headlands. Narrow beaches front most of the bluffs. There are intermittent large sand beaches starting just north of Port Washington. Public recreation areas are important but infrequent.

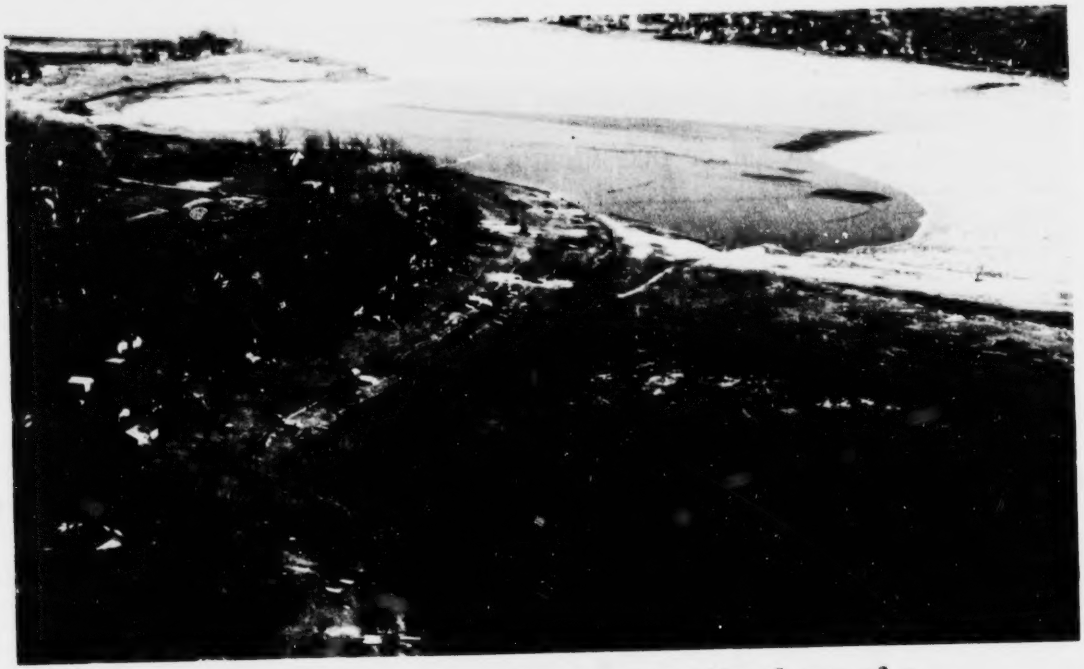

Figure No. 4 Effects of low water on recreational use of a lake in La Porte County, Indiana. Boat docks and diving barges stand useless along the former shore. Photo courtesy Indiana Department of Conservation.

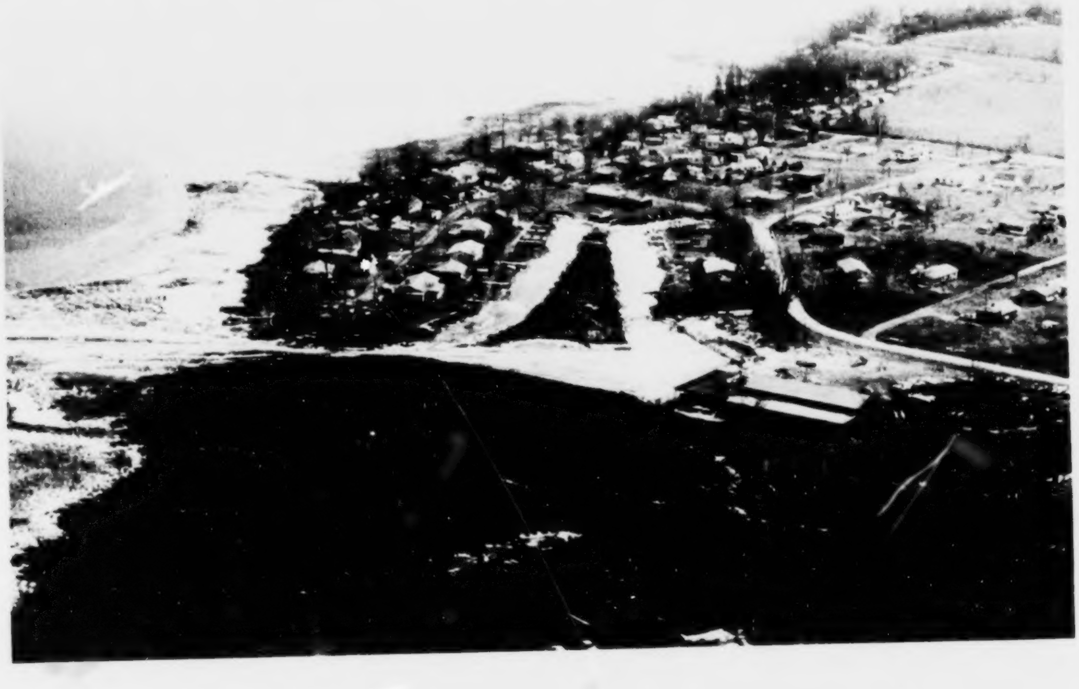

Figure No. 5 Effect of low water on marina operation. To keep the marina in operation it was necessary to dredge a channel to the lake. Photo courtesy Indiana Department of Conservation. Photos by P. Van Blaricum.

Table No. 4

EXTENT OF LAKE MICHIGAN RECREATION SHORELINE

Shore Description or use[1]	Wisconsin	Michigan	Indiana	Illinois	Total
Beach	15 mi.	115 mi.	33 mi.	13 mi.	176 mi.
Marsh	19	none	none	none	19
Bluff	375	691	none	32	1098
Total recreation shoreline	409 mi.	806 mi.	33 mi.	45 mi.	1293 mi.
Public recreation areas	13 mi.	40 mi.	3 mi.	24 mi.	80 mi.
Percent of Recreation Shoreline in Public Areas	3%	5%	9%	53%	6%

[1] The following definitions as contained in ORRRC Report No. 4 were applied.

Beach - a wide expanse of sand or other beach material lying at the waterline and of sufficient extent to permit its development as a facility without important encroachment on the upland.

Bluff - a bank or cliff immediately landward of a relatively narrow beach (if any) and varying in height from several feet up to mountainous elevations.

Marsh - tidal or nontidal marsh.

The recreation shoreline of the Michigan portion of the Lake is 806 miles with about 40 miles, or five percent, of this devoted to public recreation areas. The shore of the Lake is generally a mixture of old Lake bluffs fronted by narrow sand beaches and long stretches of excellent sand beach backed by dunes. They are, on the whole, attractive areas for recreation. Offshore water areas of the beaches are safe - relatively shallow and sandy. See Figure No. 6. Outcroppings of dolomite and limestone periodically form scenic points along the relatively undeveloped Upper Peninsula shore. The southern portion of the shoreline is moderately developed, mostly for private residential use. There are many areas of substantial extent along the Lower Peninsula shore that are undeveloped. Commercial and resort development is very limited.

The recreation shoreline of the Indiana portion of the Lake is 33 miles. Three miles, or nine percent, of this is devoted to public recreation areas. Except for the industrially developed area which covers the western half of the Lake shore, it is a wide sand beach and dune area. The Indiana dunes are a spectacular natural feature resulting from the shore being a natural collection area for littoral sand. A large portion of the eastern shore is held in private ownership for future industrial development. Much of the shore is well suited to water recreation activities.

A phenomenon unique to the southern shore of Lake Michigan in the vicinity of Michigan City, Indiana is the "Singing Sands." This area contains a large expanse of exceptionally fine, white sand which gives the impression of a singing sound as one walks along the beach scuffing his feet. The area is of high recreational value.

Inland Lakes

Wisconsin, Michigan and that portion of Indiana that drains into Lake Michigan are well endowed with natural inland lakes. Using state listings, a total of 8,186 lakes are accounted for in the Lake Michigan Basin. A listing of the number of lakes and the lake acreage of each county in the Basin is shown on Table No. 5. Table No. 6 lists the lakes in the Basin ten square miles or larger in size. The total surface acreage of the lakes in the Basin exceeds 680,000 acres.

Northeastern Indiana contains over 300 lakes, comprising about 22,000 acres. These lakes, formed by glacial action, constitute a considerable recreational asset for that State. They vary in size from a few acres to several square miles. The largest, Lake Wawasee, covers 2,618 acres.

Figure No. 6 Recreational use of a Lake Michigan beach unhampered by pollution. Photo courtesy Michigan Department of Conservation.

Table No. 5

INVENTORY OF INLAND LAKES IN THE LAKE MICHIGAN BASIN

County	No. of lakes in Basin part of county	Acreage	Access [1]	Remarks
ZONE 1				
Wisconsin				
Brown	1	42	0	
Calumet	7	87	4	L. Winnebago not incl.
Columbia	9	910	4	
Door	11	3,222	5	
Florence	82	5,157	53	
Fond du Lac	25	1,677	14	L. Winnebago not incl
Forest	133	19,967	87	4 lks. over 1,000 ac.
Green Lake	10	14,212	7	2 lks. over 5,000 ac.
Kenosha	0	0	0	
Kewaunee	8	242	6	
Langlade	49	3,965	35	
Manitowoc	31	926	15	
Marathon	14	1,007	6	
Marinette	156	13,097	68	
Marquette	33	4,809	14	
Menominee	49	2,418	0	
Milwaukee	5	31	0	
Oconto	131	11,039	78	
Outagamie	2	66	1	
Ozaukee	7	188	1	
Portage	39	1,510	15	
Racine	0	0	0	
Shawano	38	8,491	22	1 lk. over 6,000 ac.
Sheboygan	28	1,858	18	
Washington	11	1,776	2	
Waupaca	117	6,238	50	1 lk. over 1,000 ac.
Waushara	51	3,436	29	
Winnebago	6	160,845	6	6 lks. over 1,000 ac. L. Winnebago incl.
Zone 1 Total	1,053	267,216	540	
ZONE 2				
Michigan				
Alger	173	9,374	4	
Baraga	87	4,210	2	

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[1] Information between states is not comparable. Wisconsin figures indicate access by any publicly owned land to inland lakes only; Michigan and Indiana figures indicate access provided only by the respective State agencies and these access points are to inland lakes and streams.

Table No. 5 (con.)

County	No. of lakes in Basin part of county	Acreage	Access	Remarks
Delta	148	5,404	3	
Dickinson	115	4,707	6	
Iron	372	16,882	15	
Luce	6	2,217	2	
Mackinac	135	24,226	4	1 lk. over 10,000 acres
Marquette	510	16,080	17	
Menominee	46	2,449	3	1 lk. over 7,000 acres
Schoolcraft	340	20,861	9	
Zone 2 Total	2,932	106,410	65	
ZONE 3				
Michigan				
Antrim	76	33,735	23	2 lks. over 10,000 ac.
Benzie	59	16,635	13	1 lk. over 9,000 ac.
Charlevoix	32	22,411	13	1 lk. over 17,000 ac.
Clare	103	2,661	4	
Crawford	3	2,733	1	
Emmet	9	3,312	2	1 lk. over 1,000 ac.
Grand Traverse	186	14,730	15	1 lk. over 7,000 ac.
Kalkaska	126	4,061	19	
Lake	155	4,061	25	
Leelanau	43	16,532	9	2 lks. over 6,000 ac.
Manistee	87	6,782	13	4 lks. over 1,000 ac.
Mason	71	9,218	6	1 lk. over 1,000 ac.
Mecosta	87	3,202	8	
Missaukee	22	3,670	2	1 lk. over 1,000 ac.
Muskegon	78	10,320	1	2 lks. over 1,000 ac.
Newago	234	11,004	12	2 lks. over 1,000 ac.
Oceana	98	3,628	3	
Osceola	123	2,855	12	
Otsego	9	277	2	
Roscommon	24	1,972	3	2 lks. over 9,000 ac.
Wexford	49	6,435	2	3 lks. over 1,000 ac.
Zone 3 Total	1,674	180,184	188	
ZONE 4				
Michigan				
Allegan	125	8,063	9	1 lk. over 1,000 ac.
Barry	327	11,939	11	1 lk. over 1,000 ac.
Berrien	86	3,215	3	
Branch	78	7,767	10	1 lk. over 1,000 ac.
Calhoun	138	5,056	9	
Cass	143	10,128	13	
Clinton	48	752	2	

Table No. 5 (con.)

County	No of lakes in Basin part of county	Acreage	Access	Remarks
Eaton	34	755	0	
Gratiot	1	200	1	
Hillsdale	61	2,437	4	
Ingham	29	2,987	0	
Ionia	49	2,237	2	
Jackson	188	10,307	2	
Kalamazoo	154	9,880	9	2 lks. over 1,000 ac.
Kent	270	7,341	8	
Montcalm	242	7,320	15	
Ottawa	24	3,475	3	1 lk. over 1,000 ac.
Shiawassee	17	186	0	
St. Joseph	89	7,665	11	
Van Buren	121	6,170	19	
Total	2,224	105,880	131	
Indiana				
Elkhart	13	730	4	
Kosciusko	6	3,509	2	1 lk. over 2,000 ac.
La Grange	64	5,516	12	
Lake	2	360	2	
La Porte	10	1,221	1	
Noble	97	3,089	11	
Porter	7	169	0	
Steuben	102	7,012	11	1 lk. over 1,000 ac.
St. Joseph	2	52	2	
Total	303	21,658	34	
Zone 4 Total	2,527	127,538	164	
BASIN TOTAL	8,186	681,348	957	

Sources:

Guide to Indiana Lakes, Indiana Department of Conservation.

Public Fishing Sites on Lakes and Streams in the State of Indiana, Indiana Department of Conservation.

1964 Directory of Michigan Water Access Sites, Michigan Department of Conservation.

Michigan Lakes and Streams, Fish Division, Pamphlet No. 24, Michigan Department of Conservation.

Wisconsin Lakes, Wisconsin Conservation Department, Pub 218-64.

Table No. 6

LAKES IN BASIN TEN SQUARE MILES OR LARGER

Lake	County	Size (sq. mi.)
MICHIGAN		
Houghton	Roscommon	31
Torch	Antrim, Kalkaska	29
Charlevoix	Charlevoix	27
Manistique	Mackinac	16
Crystal	Benzie	15
Higgins	Roscommon	15
Leelanau	Leelanau	13
Indian	Schoolcraft	12
Elk	Antrim, Grand Traverse	12
Glen	Leelanau	10
WISCONSIN		
Winnebago	Winnebago, Calumet, Fond du Lac	215
Poygan	Winnebago	17
Green	Green Lake	11

Over 1,000 lakes comprising 267,000 acres lie within the Wisconsin portion of the Lake Michigan Basin. Lake Winnebago in east central Wisconsin, the largest lake in the Lake Michigan Basin, is 215 square miles in size.

Michigan has over 6,800 inland lakes within the Basin comprising more than 392,000 acres. Though ten are over ten square miles in size, many are quite small and shallow.

The inland lakes of the Basin, in combination with a forested atmosphere, form the basis of its recreational attractiveness. See Figure No. 7.

Rivers and Streams

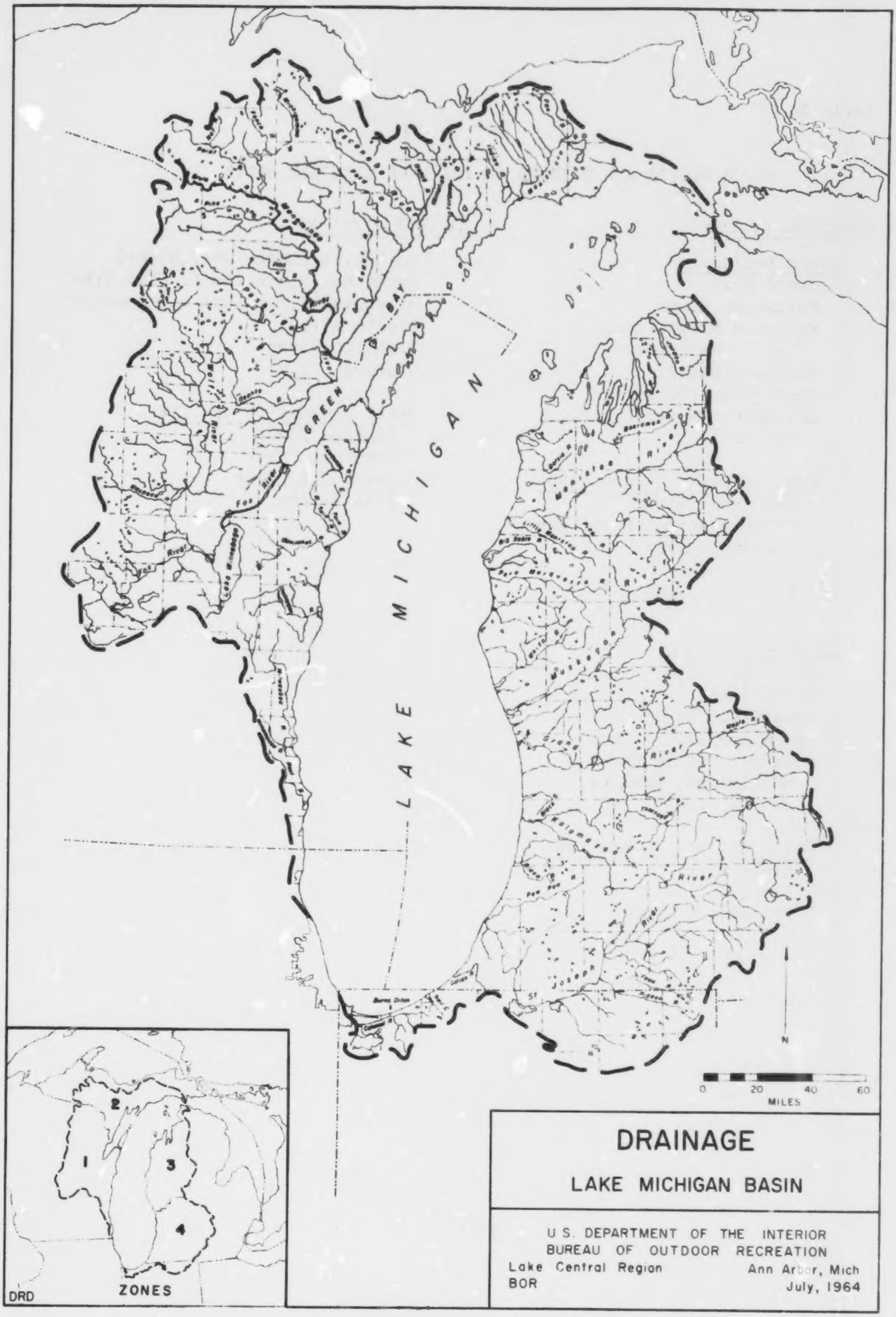
The river systems of the Basin are the products of glacial moraines and hence differ from the dendritic branching of plains country river systems in that tributaries usually come from only one side. The rivers and streams of the Basin are short with limited drainage basins. The Grand River Basin in Michigan, draining 5,622 square miles, is the largest followed by the St. Joseph, Menominee and Wolf with 4,591. 4,012 and 3,750 square miles, respectively.

Many of the rivers of northern Wisconsin and the Upper Peninsula of Michigan have their source in or flow through National or State forest lands and their watersheds are, to a large extent, protected from major sources of pollution. Such protection, however, does not extend to the lower portions of certain of these streams and several are subject to pollution. Plate No. 25 indicates locations of water quality impairment on streams within the Basin. Many of the streams in southern Wisconsin, Michigan and northern Indiana flow through heavily urbanized sections and are subject to water quality degradation.

Recreationally, most rivers and streams are important for fishing, boating and canoeing and many emptying into Lake Michigan have importance in that they provide mooring areas for recreational craft at embayments near their mouths.

The drainage system of the Lake Michigan Basin is illustrated on Plate No. 2 and the major rivers and streams are listed on Table No. 7.

Figure No. 7 Scene on a beautiful inland lake in the Lake Michigan Basin with adjacent forested atmosphere. Photo courtesy Michigan Tourist Council.


GREEN BAY
LAKE MICHIGAN
Fox River
Grand River
Kalamazoo River
St. Joseph River
0
20
40
60
MILES
N
2
1
3
4
ZONES
DRD

DRAINAGE

LAKE MICHIGAN BASIN

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF OUTDOOR RECREATION
Lake Central Region Ann Arbor, Mich
BOR July, 1964

Plate 2

Table No. 7

MAJOR RIVERS AND STREAMS IN THE LAKE MICHIGAN BASIN

MICHIGAN RIVERS

Lower Peninsula

- Grand River
- Kalamazoo River
- Manistee River (incl. Little Manistee)
- Muskegon River
- Pere Marquette River
- St. Joseph River (incl. Paw Paw)

Small Streams to the Lake

- Big Sable River
- Black River at South Haven
- Boardman River
- White River
- Galien River

Upper Peninsula

- Escanaba River
- Ford River
- Manistique River
- Menominee River (incl. Cedar, Little Cedar, Michigamme, Hemlock, Paint, Iron)

Small Streams to the Lake

- Cedar River
- Sturgeon River
- Whitefish River

WISCONSIN RIVERS

- Fox River (incl. Wolf River)
- Menominee River (incl. Pine, Pike)
- Milwaukee River (incl. Menomonee)
- Oconto River
- Peshtigo River
- Sheboygan River

Small Streams to the Lake

- Ahnapee River
- Kewaunee River
- Manitowoc River
- Twin Rivers

INDIANA RIVERS

- Calumet River
- Trail Creek
- St. Joseph River
- Burns Ditch

THE PEOPLE AND THEIR REQUIREMENTS

The Resident Population

The Lake Michigan Basin had a 1960 resident population of about 5.3 million people. This is an increase of 35 percent over the 1940 population of 3.9 million. Eighteen percent of the present population is concentrated in Milwaukee County, Wisconsin, which represents only 0.5 percent of the Basin's land area, whereas the Upper Peninsula of Michigan, which makes up 20 percent of the Basin's land area, contains but four percent of the population. Thus, there is a very uneven distribution of people over the Basin. This is graphically portrayed in Figure No. 8. Although the population of the study area increased by 1,551,000 people during the period 1940-1960, 16 of the 78 counties within this area lost population and nine other counties gained less than 1,000 people. The 25 counties in this category lie in the northern portion of the study area and were formerly important lumber producing areas. See Figure No. 9. With the decline in this natural resource came a decline in population and a migration to the industrial areas in the southern portion of the study area and elsewhere in the United States. This trend continues to the present with few exceptions. A University of Wisconsin publication, Wisconsin's Changing North, describes the decline in population of northern Wisconsin for the past two decades and states, "It is difficult to foresee for the near future any reversal of the present population trends." Thus, the situation in the northern portion of the study area indicates little expectation of significant population growth through 1970.

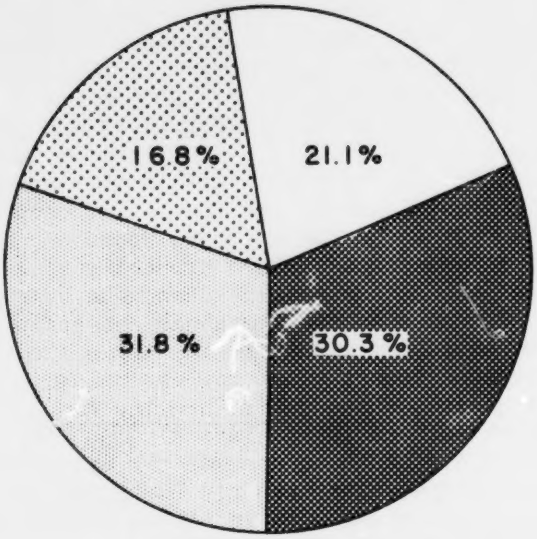
In the southern portion of the study area, industrialization and urbanization began during the period of logging in the north. It increased rapidly as the forest resources dwindled. The population of Milwaukee County, Wisconsin, increased 33 percent between 1940 and 1960 while the State as a whole gained 26 percent during the same period. Michigan experienced a 22 percent increase in population during the period; however, the seven counties in the southwestern corner of the state experienced a 25 percent increase. Six Indiana counties in the watershed experienced a 42 percent increase in population as compared to a growth of 34 percent for the State as a whole. Rates of population change by zone are graphically portrayed in Figure No. 10.

Resources for the Future, Inc., Reprint No. 3, entitled, Urban Growth and Highway Construction, by E. A. Ackerman, indicates the outlook for prospective population growth is one of increasing concentration within the eastern-midwest urban region of the United States. This region includes the southern portion of the study area.

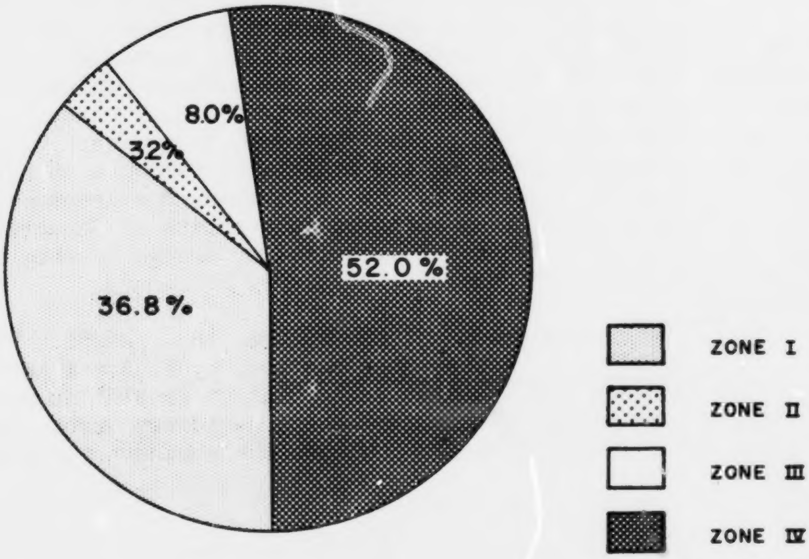
FIGURE NO. 8

COMPARISON OF LAND AREA AND POPULATION BY ZONE

LAKE MICHIGAN BASIN



LAND AREA



POPULATION

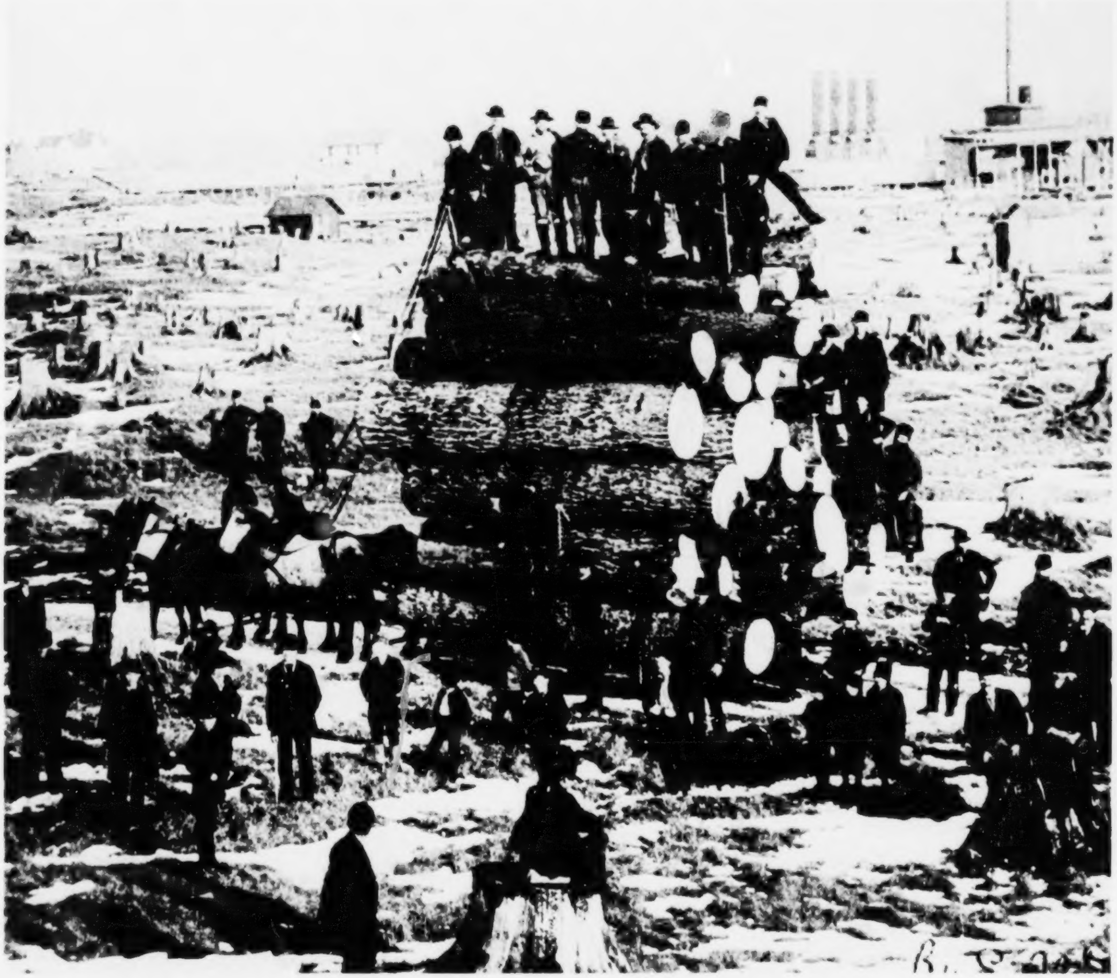
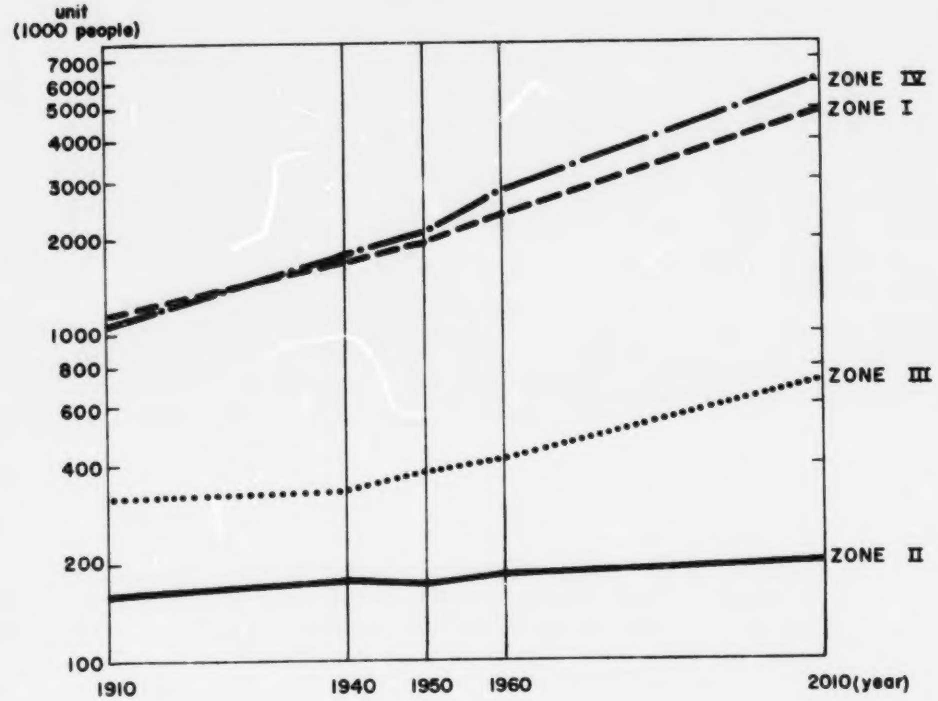


Figure No. 9 Early logging operation near Hermansville, Michigan. Much of the virgin white pine which was not clear-cut was burned as a result of uncontrolled flash fires. Photo courtesy Michigan Department of Conservation.

FIGURE NO. 10

RATES OF POPULATION CHANGE BY ZONE LAKE MICHIGAN BASIN

(2010 estimated by P.H.S.)



Mr. Ackerman's article also indicates that the interstate highway system will cause the large metropolitan areas to coalesce with the end result that the southern end of Lake Michigan from Milwaukee, Wisconsin to Michigan City, Indiana, may well become a future megalopolis. Accordingly, though the population of the watershed may be expected to double between 1960 and 2010, the major segment of this population will be concentrated in the southern portion of the Basin.

The Economy

Transportation and availability of natural resources played a major part in the economic development of the Lake Michigan Basin. Many of the cities of the Basin had their beginning as fur trading posts. While the fur trade declined, the lumbering industry began to grow in the northern half of the Basin. Copper and iron mining also developed, principally in the Upper Peninsula, about the same time. Each major enterprise helped to develop and support trade and other commercial activities within the Basin. As the land was cleared, farming of the cut-over and burned-over land was attempted and eventually proved uneconomical in most locations due to poor soil conditions. By 1910, most of the virgin pine timber had been cut. As a result of these factors, the economy in the northern portion of the Basin declined. There were exceptions where sawmills, paper mills or areas of land suitable for specialized types of farming bolstered local economies. Milwaukee is the largest metropolitan area in the Basin with a 1960 population of 1.2 million. The dollar value of manufacture in Milwaukee County increased almost 60 percent between 1947 and 1962. Other smaller metropolitan areas in the Basin include Muskegon, Kalamazoo, Battle Creek, Grand Rapids and Jackson, Michigan; Green Bay, Wisconsin and Gary, St. Joseph-Elkhart, Indiana. Present signs indicate that the metropolitan areas will continue to make large increases in rate of growth and in total growth economically.

Mr. Ackerman, in his previously referenced article, discussed a 1931 statement by Mark Jefferson, a pioneer student of urban characteristics, in which he said: "Cities do not grow of themselves. Countrysides set them up to do tasks that must be performed in central places." Mr. Ackerman reversed this dictum by stating, "In the United States of today and the immediate future, the countryside is set up to do tasks which cannot be performed in urban areas." This very aptly describes the conditions in the Lake Michigan Basin. Indications are that the economy and the population of the urbanized areas will continue to grow and expand while the so-called "hinterlands," or northern portion of the study area will continue to serve these areas, for which the provision of outdoor recreation opportunity is extremely important.

Disposable per capita income gives an indication as to the amount of money people have to spend on outdoor recreation activities. The disposable per capita income nationally in 1960 was $2,217. It was $2,636, $2,188, $2,157 and $2,317 for Illinois, Indiana, Wisconsin and Michigan, respectively, for the same period. The ORRRC Study predicts a disposable per capita income of $2,941 for 1976 and $4,104 for 2000. Thus, by the year 2000, the disposable per capita income will double nationally, and if the trend in the states surrounding Lake Michigan continues, it will be higher in the Basin states than for the nation as a whole. It, therefore, appears that the increasing population will have increasing amounts of money to spend on outdoor recreation activities.

Transportation

Water transportation served initially in opening the Basin but as the lumber and mining industries developed in northern Michigan and Wisconsin, railroads pushed into the area from the east. The first railroad reached Michigan in 1832. For Wisconsin, railroading began in the early 1850's. Railroading reached its zenith in 1910 when there were about 9,000 miles of track in Michigan and 7,500 in Wisconsin. With the decline in lumbering activity in these states came a decline in the need for rail trackage. Mass production of automobiles and better roads are also responsible for the decline in the importance of rail travel. The railroads helped cities such as Milwaukee become important trade centers.

Transportation will continue to play an important role in the economic development of the Basin. However, highway transportation now dominates while water and rail transportation assume a less important role. It appears likely that air transportation will become most important by 2010.

The urbanized areas in the southern portion of the Basin benefit by continually improved transportation facilities, i.e., through the development of interstate highways, improved airports and the St. Lawrence Seaway. Michigan has excellent north-south access via I-75 to the recreation areas of the northern Lower Peninsula. However, the recreation needs of the urbanized southern portion of the Basin are not reflected in expressway connections with northern Wisconsin and the Upper Peninsula of Michigan. Construction of the Mackinac Straits Bridge and continuing improvements in arterial highways has helped to make the Upper Peninsula more accessible to recreationists.

The increased mobility of the public resulting from improved methods of transportation will in turn expand the use of recreation facilities by increasing the number of trips made to such facilities and extending the distance which users will travel to reach the facilities. A Bureau of the Census report indicates that 84 percent of the trips made for vacation and pleasure are by automobile. The report also indicates only four percent of such trips are presently made by air. However, as air travel becomes more competitive with auto travel, it will assume a more important role, increasing the speed and distance to which those seeking recreation will travel. Air travel has already become important enough that many resorts in the Basin have their own air fields and air lines make increased numbers of stops and flights to recreation areas in season.

Leisure Time

The ORRRC studies indicate the average work week, which has decreased from 70 hours in 1850 to 40 hours in 1950, will continue to decrease to 36 hours by 1976 and 32 hours by 2000. The report further indicates at least one-fifth of all free time is spent in outdoor recreation pursuits at present and that it may be expected to remain at least this much in the future.

Visiting Population

Lake Michigan has had a long and picturesque recreation history. Early residents of Chicago established resorts along the Lake shore. In the 1880's steamboat and railroad excursions in the Basin became popular. See Figure No. 11. Several famous marine tragedies such as the sinking of the Eastland in Chicago Harbor in 1915 involved people on recreational outings.

To present a true picture of the relationship of recreation activity in the watershed, it is necessary that consideration be given to the population within a regional area of influence. This area may be represented by the states of Wisconsin, Michigan, Ohio, Indiana, and Illinois. These five states produce more than 80 percent of the people who participate in recreation in the Basin. The 1960 population of these states was 36,225,000. This figure may be expected to increase 40 percent by 1980 and more than double by 2010.

The Michigan Tourist Council indicates that while half the vacationers are residents of the state, another 40 percent come from the states of Indiana, Ohio, Illinois, and Wisconsin. The Wisconsin Department of Resource Development, on the other hand, estimates 38 percent of its vacationers are from within the state while 41 percent come from Indiana, Ohio, Illinois, and Michigan.

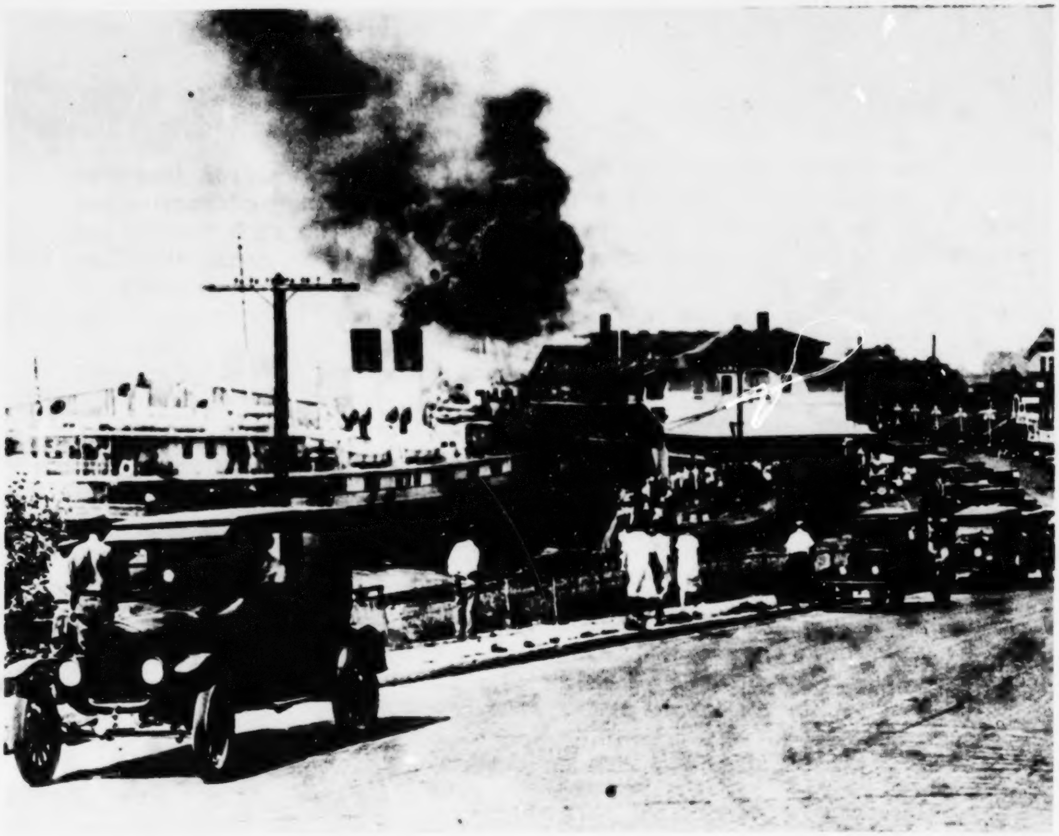


Figure No. 11 An early day excursion boat which ran between southern Michigan and Chicago. The fare was two dollars and the trip took most of a day. Photo courtesy Michigan Historical Society

Several studies--California Plan, Part I; Report on the Comprehensive Survey of the Water Resources of the Delaware River Basin, Appendix I; ORRRC Report No. 4,--agree that the travel distance limit for a one-day outing is about two hours driving time. Thus, the large metropolitan areas just outside the Basin--southeastern Michigan, northern Ohio, and the Chicago-Gary complex, which was considered a part of the Illinois River Basin Study--are for the most part also outside the day use zone of a large portion of the Basin. However, most two-day or weekend recreation outings are considered to be within 150 to 200 miles of the participant's residence and, thus, these metropolitan areas are within Basin range for such outings.

Length of stay of non-resident vacationers in the Lake Michigan Region varies considerably depending on where the figures are obtained. The Michigan Tourist Council indicates the average vacation visit is 11.5 days in length while that state's highway department survey report indicates the average length of stay is 5.84 days. The highway department figure is based on information collected at tourist information centers and, therefore, would leave out those vacationers who do not stop, such as those owning cottages on a lake who would know their destination. The Wisconsin Department of Resource Development uses 7.4 days as the length of time the average non-resident spends in that state on vacation.

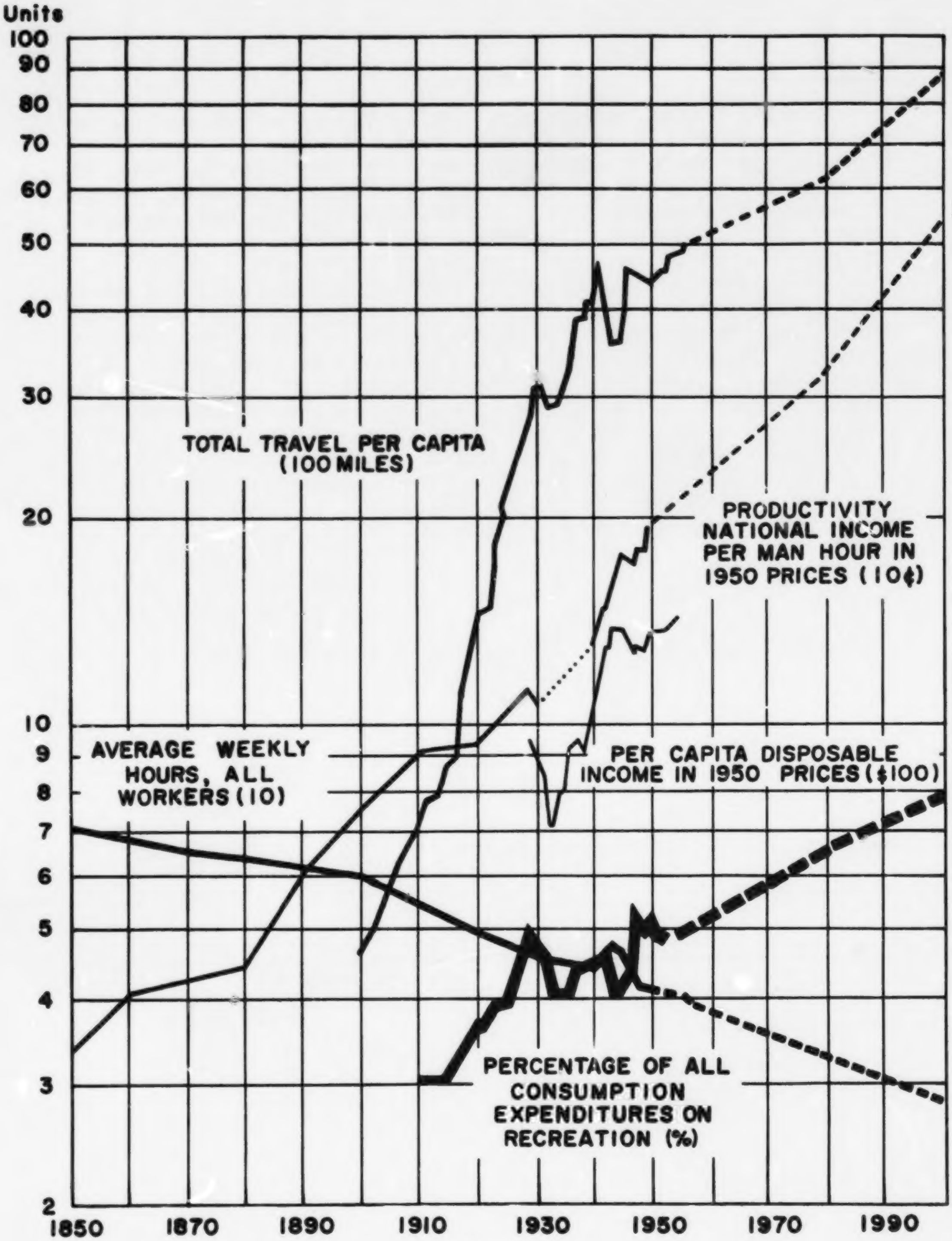
Outdoor Recreation--A Basic National Requirement

The outdoors has been very much a part of the American past and while making outdoor recreation available to the public has long been a National concern, this field of endeavor has recently taken on new dimensions. "From the beginning, one of the strongest currents in American thought has been the idea that the outdoors is a right of Americans--not only something to be enjoyed, but vital to our spirit," so states Outdoor Recreation for America. See Figure No. 12. This basic feeling, coupled with the factors previously described: increasing population, both resident and non-resident; increasing income; greater mobility brought about by improved transportation and additional leisure time, mean more people with more money will have more time to travel farther, easier and make ever increasing use of available recreation facilities. These factors are graphically portrayed in Figure No. 13.

Figure No. 12 Enjoying water oriented outdoor recreation activity along one of many unpolluted inland lakes of the Northern Lake Michigan Basin. Will this always be possible? Photo courtesy Wisconsin Department of Conservation.

FIGURE NO. 13

INCOME, TRAVEL AND LEISURE FACTORS AFFECTING THE USE OF OUTDOOR RECREATION FACILITIES, 1850-2000



SOURCE: LAND FOR THE FUTURE, RFF

DEMAND FOR OUTDOOR RECREATION

Present Demand

In the United States today, recreation is considered in many ways as important a factor as work, food, clothing or housing by those planning our National development. By and large we have met our basic needs for life. Recreation is a human need which, though not necessary to sustain life, is essential to the well being of people. In the future its importance will increase.

The best available basis for estimating present outdoor recreation activity in the Lake Michigan Basin is found in the Outdoor Recreation Resources Review Commission reports. The ORRRC studies concluded that people throughout the United States take part in various types of recreation with varying frequencies. Combining this information with the calculated effective population utilizing the basin, the present demand for outdoor recreation activities in the basin was determined. The total annual outdoor recreation activity in the basin is 180 million activity days as shown on Table No. 8: that portion of it which is water dependent is 74,490,000 activity days, as also indicated in the referenced Table.

Table No. 8

SUMMARY OF WATER-ORIENTED RECREATION ACTIVITY: 1960
LAKE MICHIGAN BASIN

Activity Type	Summer (June-July-August) Activity Days 1/	Annual Activity Days 1/
Water Dependent 2/	54,225,000	74,490,000
Water Enhanced 2/	43,328,000	94,766,000
Winter Sports	n.a.	10,566,000
Total Water-Oriented 2/	97,553,000	179,822,000

1/ To nearest 100,000
2/ See definition Appendix "D"

The individual activities making up these figures are shown on Table No. 9. Since these figures represent an important factor in illustrating the recreational needs of the Basin, an explanation of the method of arriving at the present demand is included in Appendix D.

It is recognized that the Basin, being a popular vacationland, is subject to considerable influx by non-resident vacationers. The Basin's principal market area covers Ohio, Indiana, Illinois, Wisconsin and Michigan or those states within one day's drive of it. This is a market of some 40 million potential customers as portrayed on Plate No. 3. These people are considered in calculating the present and projected demand. However, the portion of this group not reflected in the determination of the effective population, on which the demand figures are based, are those who come from a distance greater than 125 miles for extended vacations. No valid method of including this portion of the recreation activity could be determined though it was felt that it is significant, perhaps as much as 20 percent of the demand. Therefore, the recreation demand as calculated is considered conservative.

Projected Demand

Projected demand for recreation activities within the Basin to the year 2010 has been confined to water dependent activities only. It was concluded that the ORRRC studies offered the best basis for such projections. These studies, however, projected only to the year 2000, requiring extension to the year 2010.

Basin activity figures from Table No. 10 were based on summer recreational use as shown in Table No. 9 and additional information from Table No. 6, ORRRC Report No. 26. Figures from columns 2, 3 and 5 of Table No. 10 for the various water dependent activities were plotted on a graph and the lines were extended to intersect the 2010 line. Both "with" and "without" opportunity factor lines were plotted, thus obtaining a range of probable activity. Accordingly, swimming and boating occasions in 2010 may each be expected to be between four and five times their present number, fishing may be expected to double and water skiing occasions may be expected to rise to between six and seven times present activity.

The factors influencing the demand for water dependent recreation--namely, increase in population, higher income, more leisure time and greater mobility--are represented in figures obtained from the ORRRC report and, therefore, these factors are represented in the projections. In addition, the projections are based on the

Table No. 9

PRESENT DEMAND FOR SELECTED WATER ORIENTED OUTDOOR RECREATION ACTIVITIES LAKE MICHIGAN BASIN

Activity	Annual Participation Rate ORRRC	Summer Participation Rate ORRRC	Annual Basin Adjusted Rate	Summer Basin Adjusted Rate	Annual Activity Days 1,000's	Summer Activity Days 1,000's
Water Dependent Activities						
Swimming	5.34	4.63	5.56	4.82	36,949	32,032
Fishing	4.01	2.05	4.17	2.13	19,000[1]	9,700[2]
Boating (General)	2.21	1.48	2.30	1.54	15,285	10,234
Water Skiing	.27	.21	.28	.22	1,861	1,462
Canoeing	.13	.07	.14	.07	930	465
Sailing	.07	.05	.07	.05	465	332
Sub-Total (Water Dependent Activity Days)					74,490	54,225
Water Enhanced Activities						
Camping	.65	.40	.68	.42	4,519	2,791
Picnicking	3.64	2.34	3.79	2.44	25,187	16,215
Sightseeing	6.64	2.71	6.91	2.82	45,921	18,740
Nature Walks	2.42	.60	2.52	.62	16,747	4,120

Table No. 9 (con.)

Activity	Annual Participation Rate ORRRC	Summer Participation Rate ORRRC	Annual Basin Adjusted Rate	Summer Basin Adjusted Rate	Annual Activity Days 1,000's	Summer Activity Days 1,000's
Water Enhanced Activities (con.)						
Hiking	.35	.21	.36	.22	2,392	1,462
Sub Total (Water Enhanced Activity Days)					94,766	43,328
Winter Sports Activities						
Ice Skating	.99	--	1.03	--	6,845	
Snow Skiing	.07	--	.07	--	465	
Sledding	.46	--	.49	--	3,256	
Sub-Total (Winter Sports Activity Days)					10,566	
Grand Total (Water Oriented Activity Days)					179,822	97,553

1/ Figure is based on information furnished by the Bureau of Sport Fisheries and Wildlife in accordance with Section 2C of the Memorandum of Understanding of February 3, 1965 between the Bureau of Outdoor Recreation and the Bureau of Sport Fisheries and Wildlife and was not calculated in the same manner as other figures.

2/ Figure was calculated using the proportion; annual participation rate (adjusted) is to Summer participation rate (adjusted) as Annual fishing activity days are to Summer fishing activity days.

URBAN POPULATION DISTRIBUTION

NORTHEASTERN UNITED STATES : 1960

(AREAS OVER 50,000)

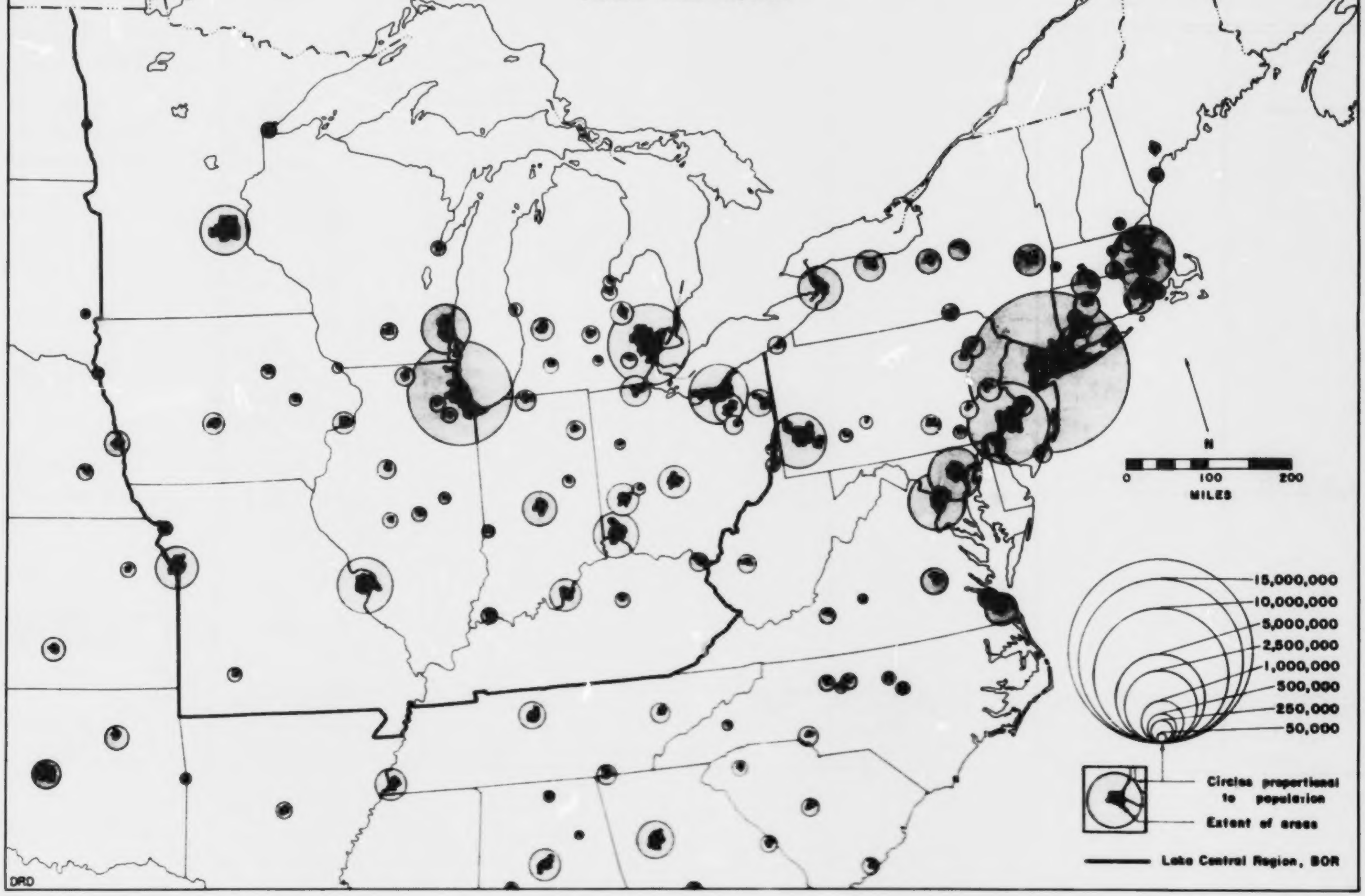

N
0
100
200
MILES
15,000,000
10,000,000
5,000,000
2,500,000
1,000,000
500,000
250,000
50,000
Circles proportional to population
Extent of areas
Lake Central Region, BOR
DRD

Plate 3

Table No. 10

NUMBER OF OCCASIONS[1] (IN THOUSANDS) OF PARTICIPATION IN WATER DEPENDENT ACTIVITIES IN 1960, 2000 and 2010 IN THE LAKE MICHIGAN BASIN
(June-July-August)

		Without opportunity factor[2]		With opportunity factor[3]		Range extended to 2010	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Occasion	1960	2000	Percent Change[6]	2000	Percent Change[6]	Without opportunity factor	With opportunity factor
Swimming	32,032	109,870	243	128,128	300	129,430	152,730
Fishing[4]	9,700	19,400	100	19,400	...	21,800	21,800[4]
Boating (other than canoeing or sailing)	10,234	35,819	250	42,676	317	42,050	51,380
Water skiing	1,462	7,076	384	8,421	476	8,760	10,210
Canoeing[5]	465	1,627	250	1,939	317	1,940	2,340
Sailing[5]	332	1,162	250	1,384	317	1,220	1,640
TOTAL WATER DEPENDENT ACTIVITIES	54,225	174,954		201,948		205,200	240,100

[1] Number of separate days on which persons engaged in activity during June-August.
[2] Assumes continuing 1960 quality and quantity of facilities available on a per capita basis.
[3] Assumes improvement from 1960 quality and quantity of facilities available on a per capita basis.
[4] Based on information obtained from the Bureau of Sport Fisheries and Wildlife.
[5] Assumes rate of growth same as for boating.
[6] From Table 6, ORRRC Report 26.

assumption that adequate facilities will be available. Water quality will play a key role in determining whether this Basin will or will not be able to meet the projected need for more than 150 million swimming occasions in 2010.

SUPPLY OF OUTDOOR RECREATION AREAS

Recreation Resources

The Lake Michigan Basin Study area possesses vacation attractions that are nationally recognized. Lake Michigan, with its sand beaches and dunes, over 8,000 inland lakes, 30,000 miles of rivers and streams, millions of acres of public and private forest land, many Federal, state, county, and local parks and recreation areas, many winter sports areas, superb hunting and fishing country, historic forts, forest campgrounds, and fine scenery combine to create an environment conducive to recreation of national significance. All of this recreational abundance is easily accessible to more people today than ever before. The drawing power of the Basin is summarized by this listing of its natural attractions which provide the setting for the recreational activities.

Recreation Areas in the Lake Michigan Basin

As the natural resources provide the setting for the recreational activities, established recreational areas and their attendant facilities provide the means to enjoy them. For purposes of this report, areas where some type of recreation takes place have been subdivided under two categories: 1) natural areas such as an undeveloped strip of beach, lake, or section of a river lacking adequate access or a tract of forest land with no facilities for enhancing outdoor recreation enjoyment; 2) developed natural areas such as parks, recreation areas, beaches with facilities, forest campgrounds, resorts, and other developed recreation facilities. The developed recreation areas are currently carrying the major burden of meeting present demand. It is recognized, however, that some recreational activity takes place in other than developed areas which, when developed, will provide the basis for supplying future demands. See Figure No. 14.

Outdoor recreation areas generally experience an increase in use after development takes place. Swimming and sun bathing take place along many miles of Lake Michigan shoreline, but not until a strip of beach is supplied with such facilities as bathhouses, parking areas, lifeguards, and concessions does the use become heavy. Thousands of acres of prime forest land are suitable for camping, but not until toilets, running water, and parking areas are made available do such lands become popular with the majority of campers.

Conversely, some types of outdoor recreation do not respond to development. Canoeing is more enjoyable under more primitive conditions.

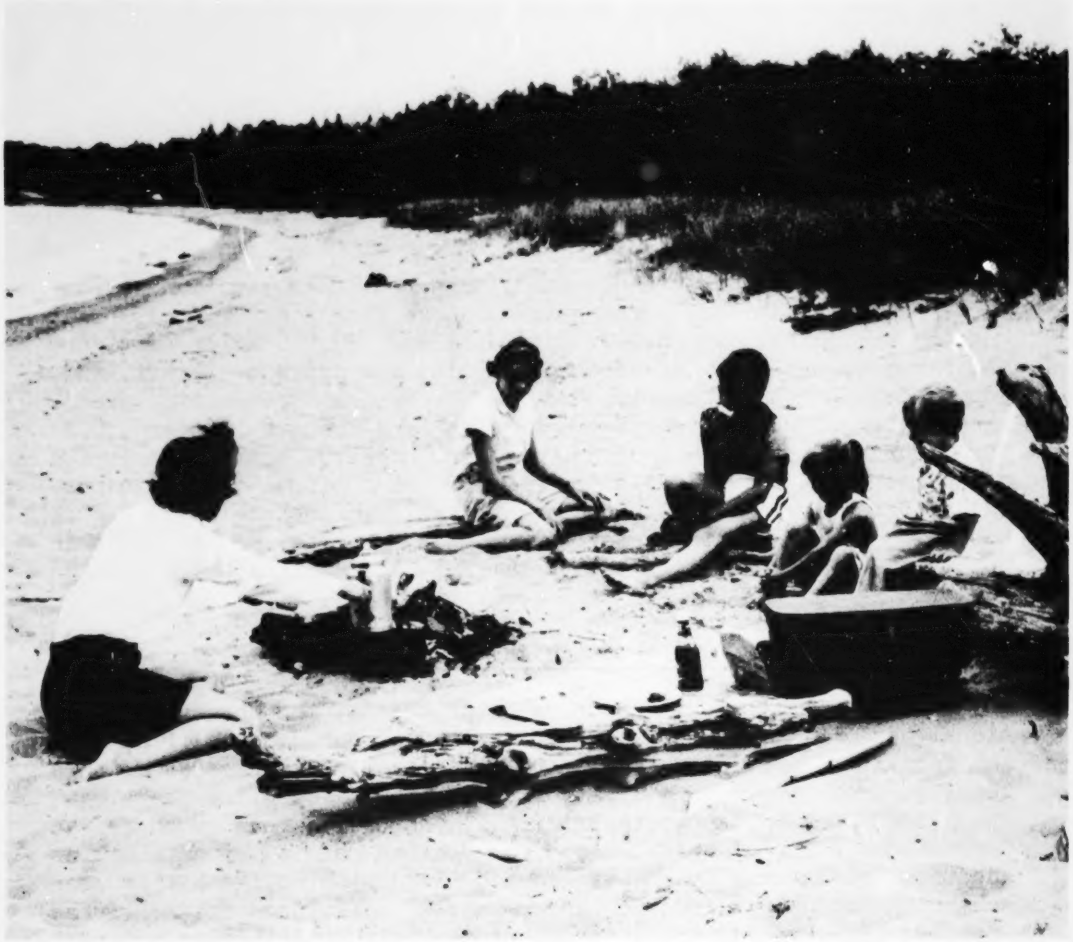


Figure No. 14 Recreational use of an undeveloped portion of the Lake Michigan shore many miles from the metropolitan areas which lie to the south. Photo courtesy Wisconsin Department of Conservation.

Swimming and Swimming Areas

Swimming and sun bathing are enjoyed throughout the Lake Michigan Basin in both natural and developed areas. There are more than 300 areas within the Basin which offer opportunity for swimming at public beaches. The beach areas along Lake Michigan, where developed, are heavily used during the summer season. See Figure No. 15. Many of the natural beach areas are used for swimming by private cottage owners and by others where access can be gained. The middle of June until Labor Day is considered the swimming season although this period is often interrupted by "cool" spells. The northern part of the Lake is more subject to cool periods than is the southern part. In the northern part the more popular swimming areas are frequently near or in the mouths of rivers and creeks where the water is warmer. Sand beaches provide the more attractive swimming areas as they are generally safer, cleaner, larger, and offer better play areas for children. Lake beaches are usually more attractive than river beaches, are safer, and usually have no currents. The state parks having better developed swimming areas are located on lakes having good sand beaches. Publicly developed areas are many times located on rivers, but swimming is usually an incidental activity to camping and other uses at such areas.

The ORRRC studies show that of Lake Michigan's 1,661 miles of shoreline, about 176 miles are classed as beach and 80 miles are classed as public recreation areas, reference Table No. 4.

The Wisconsin Conservation Department considers the optimum design factor for swimming beaches to be 200 to 300 persons per 100 feet of beach, associated area and designated water surface. Considering a mid-number use of 250 persons per 100 feet of beach and applying it to the 80 miles of public beach, the capacity would be about a million people. With acquisition and development of all beaches on the Lake, a potential to accommodate 2.3 million people at any one time for swimming exists. It is recognized that the capacity of the beaches would depend to a large extent upon the width of them. The definition of beach which was applied in arriving at the figure of 176 miles of beach, however, presumes it to be of sufficient width to permit development without encroachment upon the upland. This implies a wide expanse of beach. For swimming and sun bathing purposes, Lake Michigan beach would appear to have the potential to satisfy the present demand or the demand in the immediate future. The shortages that exist are due to: poor water quality, lack of public ownership, access, facilities and other developments and the fact that sufficient public beach facilities are not located within a reasonable distance of the people.

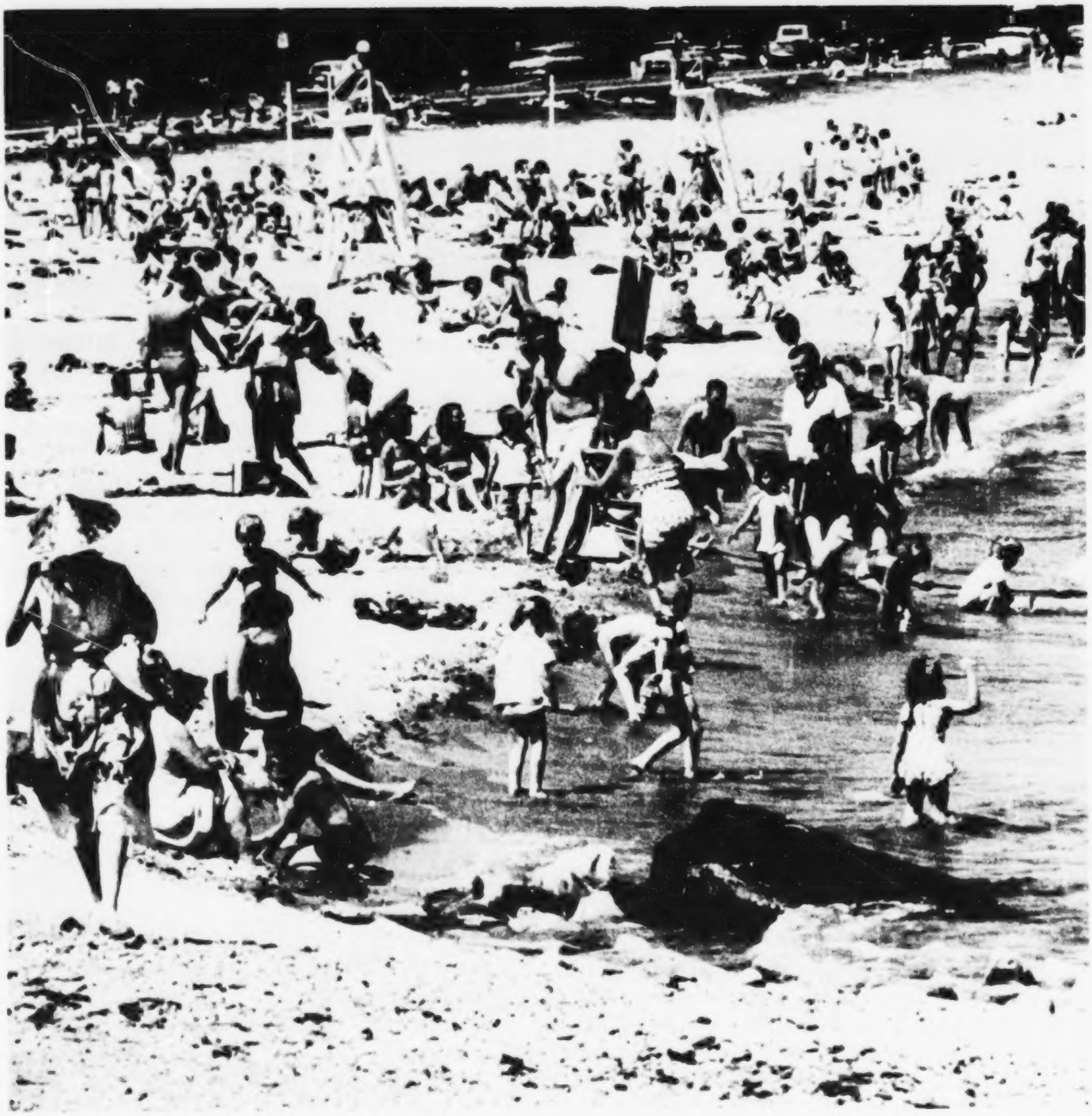


Figure No. 15 Bradford Beach, Milwaukee, Wisconsin. A highly developed heavily used beach area. Photo courtesy Historical Society of Wisconsin, a Milwaukee Journal Photo by G. P. Koshollek.

Inland lakes satisfy a large segment of the resident and visiting public demand for swimming. They vary in size, the water is warmer in summer than Lake Michigan, and they are scattered throughout the Basin. Table No. 5 lists Basin counties, number of lakes and their total acreage. Generally water quality of the inland lakes is higher than that found in rivers within the Basin, particularly those rivers that traverse areas of high population or industrialization. As a result of this and other factors influencing suitability, few beaches have been developed along rivers within the Basin.

Fishing and Fishing Areas

Wherever suitable fishing water is found in the Lake Michigan Basin, fishermen can be found. Important to the angler are Lake Michigan, inland lakes, rivers, trout streams and warmwater creeks. This report will not attempt to evaluate fishing statistics, either sport or commercial, since reports being prepared by the U. S. Fish and Wildlife Service will cover this subject. This report will, however, consider public access to fishing areas since this access is not limited to fishermen and is used by other water recreationists. Public access has been provided by state conservation departments at 457 locations to bodies of water, the majority of which are lakes. Public access made available through the efforts of other agencies has been provided at an undetermined number of other locations. Reference Table No. 5. See Figure No. 16.

One of the limitations on recreational use of water bodies is the lack of access. See Figure No. 17. The right of the public to gain access to bodies of water, whether they be streams or lakes, depends principally on whether the waters or shorelines in question are in public, as distinguished from private, ownership. Navigable waters are considered to be public property to be used not only for navigation, but for other purposes including recreation. Where the public does have a right of access, the right must be exercised in such manner that no abuse against property ownership rights is committed.

Boating and Boating Areas

In 1952, it was estimated that there were 3,219,000 outboard motors being used in the nation. By 1963, the figure had jumped to 6,390,000. Recreation craft in the nation totaled 7.7 million in 1963.

Motor boat registration in the Lake Michigan Basin in 1963 was about 262,000. Of these, about 31 percent were registered in the Wisconsin portion of the Basin, 61 percent were registered in the

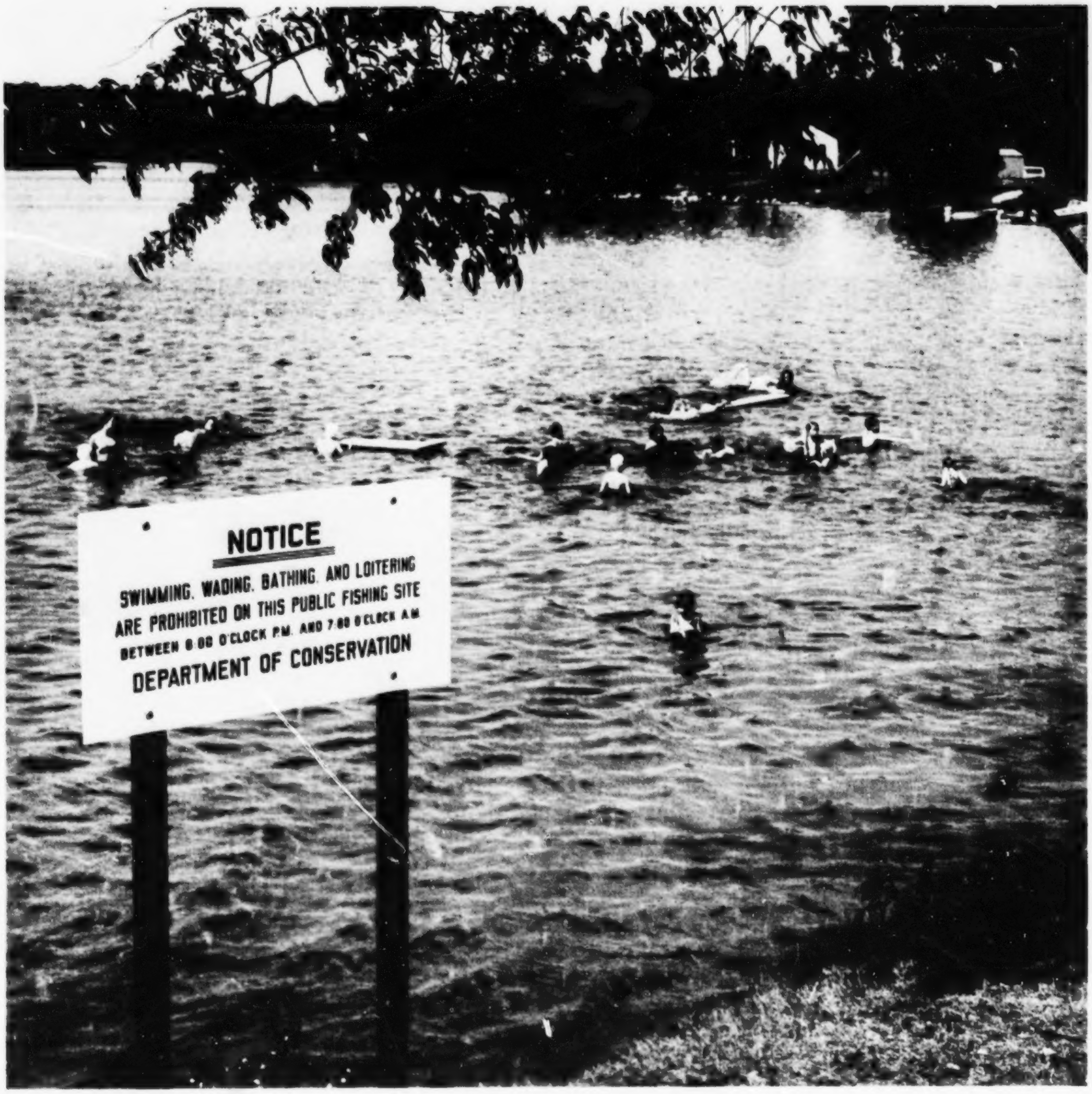

NOTICE
SWIMMING, WADING, BATHING, AND LOITERING
ARE PROHIBITED ON THIS PUBLIC FISHING SITE
BETWEEN 8:00 O'CLOCK P.M. AND 7:00 O'CLOCK A.M.
DEPARTMENT OF CONSERVATION

Figure No. 16 Though intended primarily for fishermen, public fishing sites provide access for many other types of water-oriented recreation. Photo courtesy Michigan Department of Conservation.

Figure No. 17 Private lands surrounding recreational waters often prevent public access. Photo courtesy Michigan Department of Conservation.

Michigan portion, and about eight percent were registered in the Indiana portion. Wisconsin records further showed that of nearly 22,000 registrations of out-of-state boards, about 15,000 were from Illinois, probably the bulk of these from the Chicago area. It was not possible to determine where these non-residents did the majority of their boating. It is important to remember, however, that the total available water surface of the Basin remains fairly static, and the demands for the use of this surface will continue to grow. Ten years ago, the average outboard motor was of nine horsepower. Today, it is more than 30 horsepower and climbing. Pleasure craft are becoming more elaborate and some are being lived on during weekends and during the summer period while moored in the marinas.

Boating on Lake Michigan proper generally requires a larger boat and more powerful motor than those used on inland lakes and streams. See Figure No. 18. Furthermore, harbors of refuge against wave action and storms are necessary. Few good natural harbors exist along the Lake Michigan shoreline. Such harbors as existed before improvement by the Federal Government were in mouths of creeks and rivers, or at the outlets of small lakes near the lakeshore, and were either in their natural condition or partially improved by local interests. Buildup of sand bars was and continues to be a problem around these natural harbors. The U. S. Army Corps of Engineers has developed small craft harbors at several points along the Lake Michigan shore. Even though recreational harbors are being constructed at an accelerated rate by all levels of government as well as by private enterprise, such development within the Basin is not keeping pace with increasing demand.

Beginning at Chicago and proceeding clockwise, the major recreational harbors on the Lake are shown on Plate No. 4 and are listed in Table No. 11.

Canoeing in the Lake Michigan Basin

Lake Michigan itself is not canoeing water but most of the Basin's major rivers along with their tributaries offer good canoe routes to enthusiasts. There are many other rivers and streams, certain sections of which, offer good canoeing water, plus thousands of lakes of various sizes on which canoeing takes place.

Canoeing on these waters has been important since the days of the Indian, early explorers, voyageurs and fur trappers who penetrated the Great Lakes Region. Today, nearly all canoeing is done for pleasure and its popularity has increased significantly in recent years. Unfortunately, no local or state survey data is available to estimate participation or man-day use in the Lake Michigan Basin.

Figure No. 18 Boating on the open waters of Lake Michigan.
Photo courtesy Michigan Tourist Council.

RECREATION HARBORS

LAKE MICHIGAN BASIN

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF OUTDOOR RECREATION
Lake Central Region Ann Arbor, Mich.
BOR July, 1964

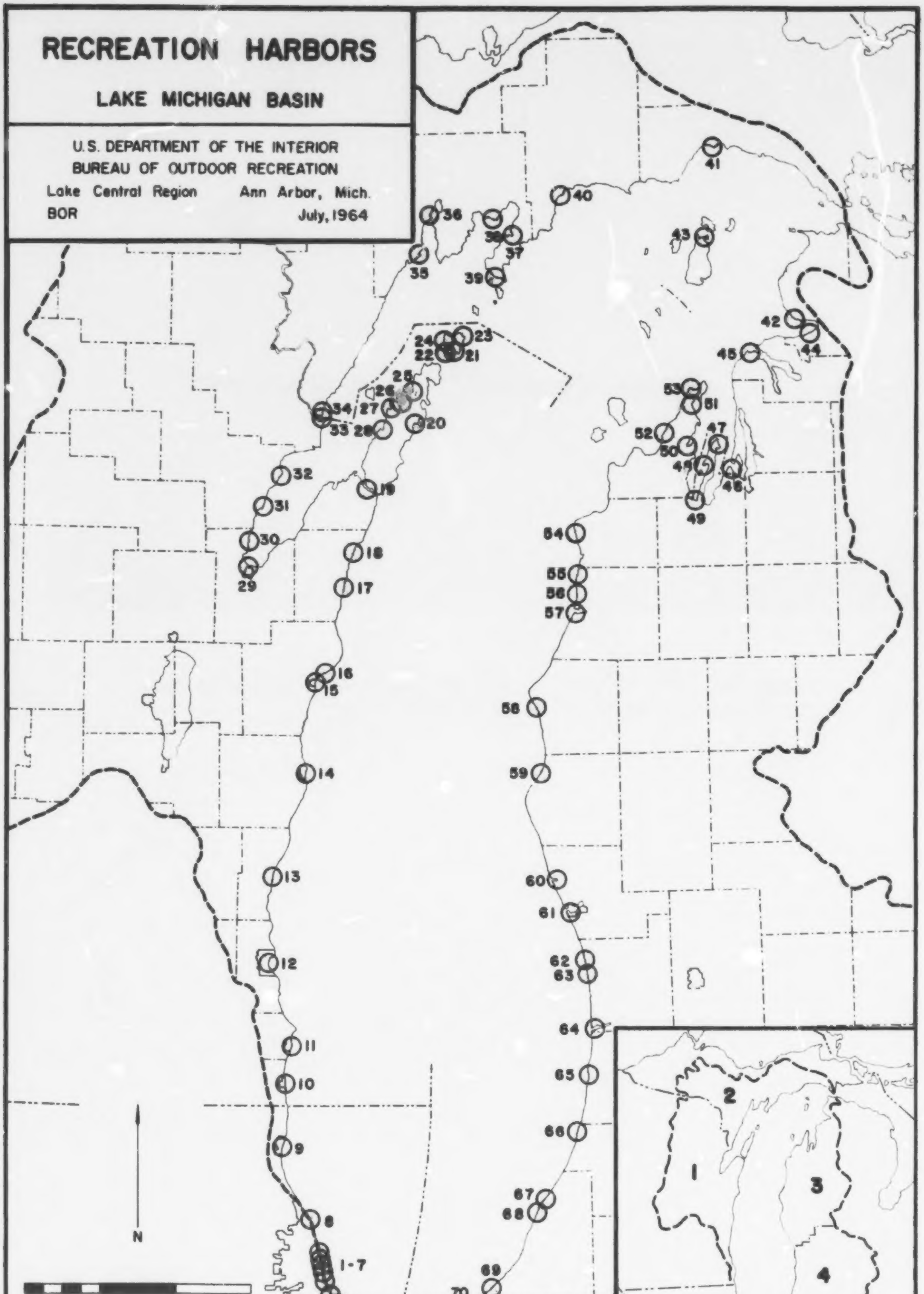

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Table No. 11

RECREATIONAL HARBORS ON LAKE MICHIGAN

Illinois	Remarks
Chicago Area	Chicago harbors are generally closed to travelers except in emergency.
1. Calumet or South Chicago	
2. Chicago Harbor	At mouth of Chicago River.
3. Jackson Park Harbor	
4. Grant Park Harbor	Open to travelers.
5. Diversey Harbor	
6. Montrose Harbor	
7. Lincoln Park Harbor	
8. Wilmette Harbor	
9. Waukegan Harbor	
Wisconsin	
10. Kenosha Harbor	Mouth of Pike Creek.
11. Racine Harbor	
12. Milwaukee Harbor	
13. Port Washington Harbor	
14. Sheboygan Harbor	
15. Manitowoc Harbor	
16. Two Rivers Harbor	
17. Kewaunee Harbor	
18. *Algoma Harbor	12 acre harbor; 10 mooring accommodations.
19. Sturgeon Bay Harbor	
20. Bailey's Harbor	
21. *Washington Island Harbor	10 acre harbor; 22 mooring accommodations.
22. Detroit Harbor, Washington Island	Large, but shallow harbor on south shore.
23. Jackson Harbor, Washington Island	Small indentation on northeast shore.
24. West Harbor, Washington Island	Small indentation on west shore.

Table No. 11 (Cont.)

Wisconsin (Cont.)	Remarks
Green Bay Area	
25. Sister Bay Harbor	
26. Ephraim Harbor	
27. Fish Creek Harbor	
28. Egg Harbor	
29. Green Bay Harbor	
30. *Big Suamico River Harbor	4 acre harbor; no moorings available.
31. *Pensuakee Harbor	5 acre harbor; no moorings available.
32. Oconto Harbor	At mouth of Oconto River at at Green Bay.
33. Marinette Harbor	
Michigan (Upper Peninsula)	
34. Menominee Harbor	Yacht harbor, recreational and fishing craft.
35. Escanaba Harbor	Municipal harbor for recreational craft; ramp.
36. Gladstone Harbor	Municipal harbor on Little Bay De Noc; 50 transient moorings.
37. Garden Bay	
38. Nahma Harbor	
39. Fairport	Fishing settlement.
40. Manistique Harbor	At mouth of Manistique River.
41. Naubinway Harbor	For small boats of less than 10 foot draft.
Michigan (Lower Peninsula)	
42. Harbor Springs	Limited area but fine harbor on Little Traverse Bay.
43. St. James Harbor Beaver Island	50 acre harbor; 30 mooring accommodations.
44. Petoskey Harbor	9 acre harbor; 20 mooring accommodations.
45. Charlevoix Harbor	Recreation, fishing craft and ferry: 45 transient moorings.
46. Elk Rapids	12 transient moorings.
47. Old Mission Harbor	East arm of Grand Traverse Bay.

Table No. 11 (Cont.)

Michigan (Lower Peninsula) (Cont.)	Remarks
48. Bowers Harbor	West arm of Grand Traverse Bay.
49. Traverse City Harbor	West arm; 100 transient moorings; 1 acre harbor.
50. Sutton Bay	West arm; 10 transient moorings.
51. Northport Marina	17 transient moorings.
52. *Leland Harbor	3 acre harbor at mouth of Carp River.
53. Cat Head Bay	
54. Frankfort Harbor	16 transient moorings.
55. Arcadia Marina	12 transient moorings.
56. Portage Lake Harbor	In Portage Lake.
57. Manistee Harbor	On Manistee River.
58. Ludington Harbor	In Pere Marquette River.
59. Pentwater Harbor	16 transient moorings; in Pentwater Lake.
60. Whitehall Harbor	In White Lake.
61. Muskegon Harbor	70 transient moorings; 291 craft in 1963; ramp.
62. Grand Haven Harbor	10 transient moorings; mouth of Grand River.
63. Spring Lake Harbor	At Grand Haven.
64. Holland Harbor	
65. Saugatuck Harbor	In mouth of Kalamazoo River.
66. South Haven Harbor	In mouth of Black River.
67. Benton Harbor	Mouth of Paw Paw River.
68. St. Joseph Harbor	Mouth of St. Joseph River.
69. New Buffalo Harbor	

Indiana	
70. Michigan City Harbor	In Trail Creek.
71. Burns Ditch	In Burns Ditch.
72. Gary Harbor	
73. Buffington Harbor	
74. Indiana Harbor	

*Denotes harbors with space for park development, camp facilities and public dock as determined by U. S. Army, Corps of Engineers, June 1950.

The ORRRC reports indicate that, in the North Central Region, the number of activity days of participation per person 12 years and older in canoeing was 0.13. Considering resident and visiting population to the Basin and applying this participation rate, an estimate of 930,000 canoeing activity days was obtained for the 1960 recreation season.

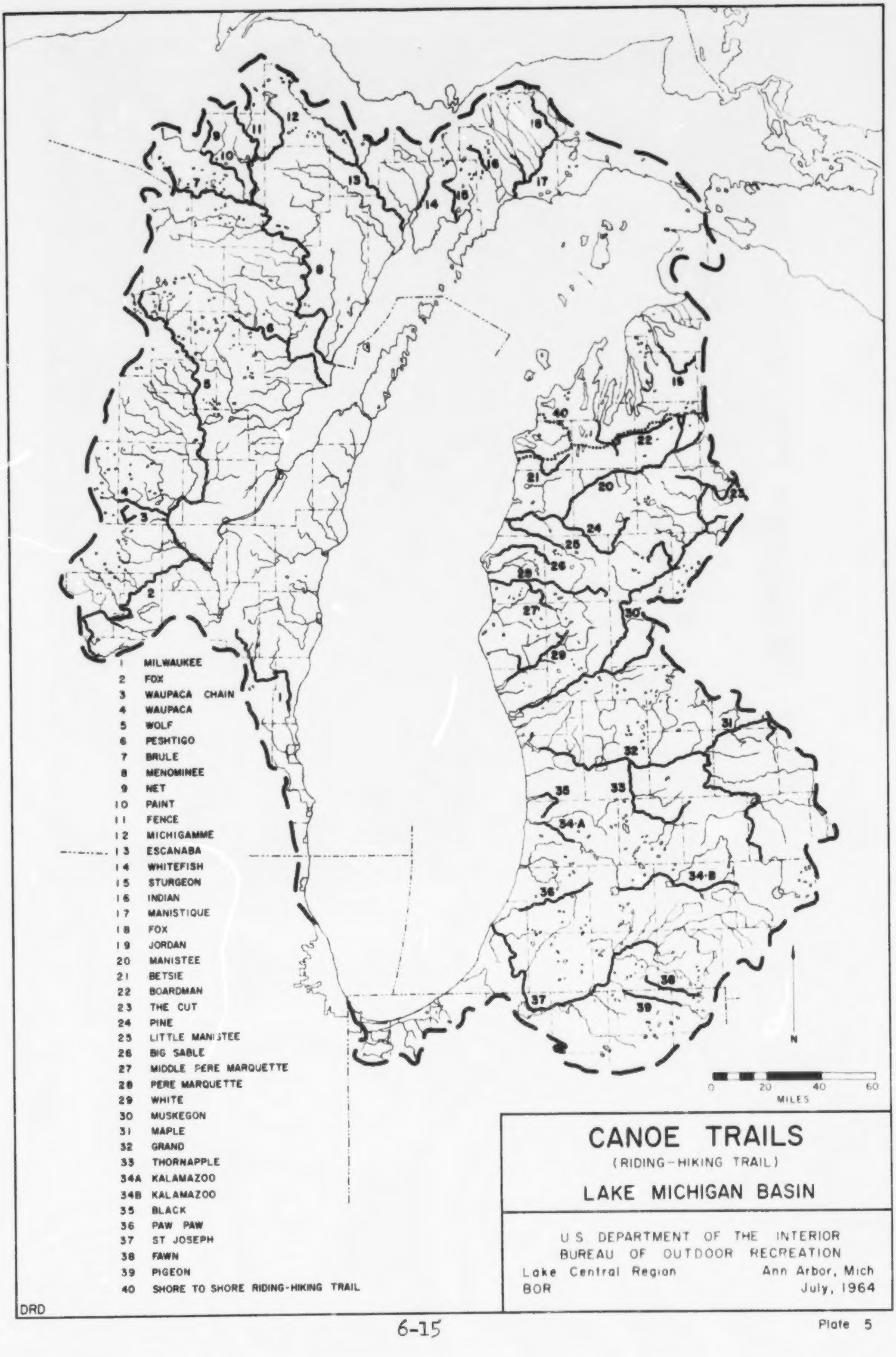
Much of the canoeing is done in rented canoes. In addition to many small canoe liveries throughout the Basin, there are several large livery establishments in Michigan that own up to 200 canoes each. The popularity in canoeing appears to be among the younger age groups and includes Boy and Girl Scout groups, youth camp groups and school groups between junior high school and college age. Plate No. 5 depicts the popular established canoe routes.

Water quality has a very definite influence on canoeing as an activity. Aesthetic enjoyment of the surroundings is a principal part of the canoeing experience. Therefore, though some rivers, such as the Milwaukee in Wisconsin and the Kalamazoo and St. Joseph in Michigan, are recognized as canoe routes, they are much less desirable for such use than such rivers as the Wolf in Wisconsin and the Pere Marquette in Michigan. See Figure No. 19. As waters are affected by urbanization and industry--their quality is lowered and their popularity as canoe routes diminishes.

Riding and Hiking Trails and Roads

In addition to the development of new trails and roads in public areas such as parks, there are several proposals for extensive riding and hiking trails and scenic parkways. Such proposals include a hiking trail from Midland, Michigan to the Mackinac Bridge. Another trail traversing the length of the Upper Peninsula is being considered. The difficulty of providing trails of such magnitude is apparent. However, through the cooperation of private landowners and interested groups in obtaining easements and rights-of-way, erecting signs and maintaining the trails, they are possible. One such riding and hiking trail crosses Michigan from Empire and Frankfort to Tawas. Through the use of interpretive signs, such trails can be of tremendous benefit in the promotion of the conservation cause, including telling the story of watershed management and water quality control.

Additional scenic road and parkway development is being planned in several portions of the Basin. Special studies and reports were made by the states for the Bureau of Public Roads on the subject of scenic roads early in 1965. In general the Lake Michigan shore lends itself well to this type of development. Along the southern



1	MILWAUKEE
2	FOX
3	WAUPACA CHAIN
4	WAUPACA
5	WOLF
6	PESHTIGO
7	BRULE
8	MENOMINEE
9	NET
10	PAINT
11	FENCE
12	MICHIGAMME
13	ESCANABA
14	WHITEFISH
15	STURGEON
16	INDIAN
17	MANISTIQUE
18	FOX
19	JORDAN
20	MANISTEE
21	BETSIE
22	BOARDMAN
23	THE CUT
24	PINE
25	LITTLE MANISTEE
26	BIG SABLE
27	MIDDLE PERE MARQUETTE
28	PERE MARQUETTE
29	WHITE
30	MUSKEGON
31	MAPLE
32	GRAND
33	THORNAPPLE
34A	KALAMAZOO
34B	KALAMAZOO
35	BLACK
36	PAW PAW
37	ST JOSEPH
38	FAWN
39	PIGEON
40	SHORE TO SHORE RIDING-HIKING TRAIL

CANOE TRAILS

(RIDING-HIKING TRAIL)

LAKE MICHIGAN BASIN

U S DEPARTMENT OF THE INTERIOR
BUREAU OF OUTDOOR RECREATION
Lake Central Region Ann Arbor, Mich
BOR July, 1964

Plate 5

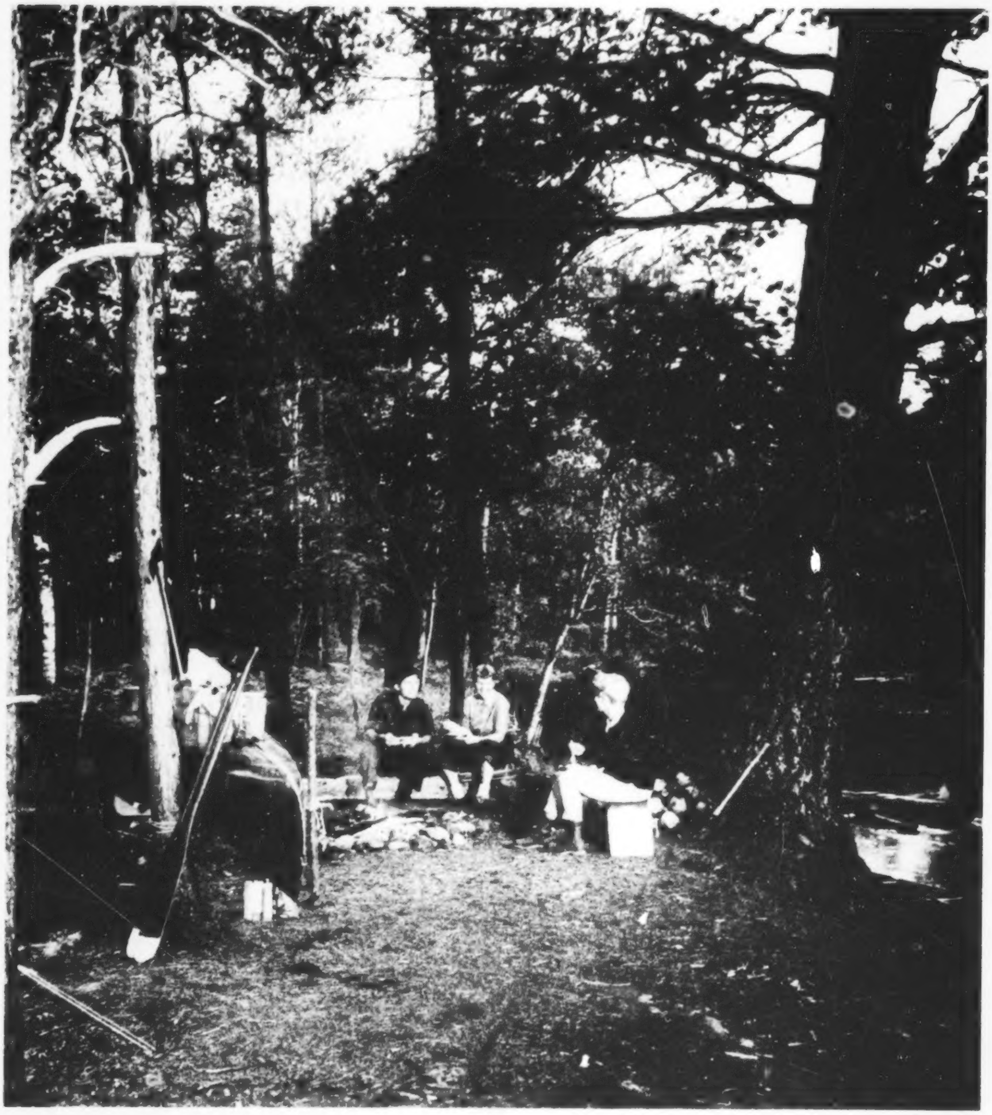


Figure No. 19. Much of the enjoyment of canoeing is related to the surroundings in which the activity is carried out. Photo courtesy Michigan Tourist Council.

shore of the Upper Peninsula much of State Highway 2 is presently a scenic lakeshore highway. In other areas, due to private development, construction of a scenic shore road would be expensive and difficult if not impossible. The State of Wisconsin has a proposed system of scenic highways which would take advantage of many of that state's areas of historical and geological interest including portions of the Lake Michigan shore.

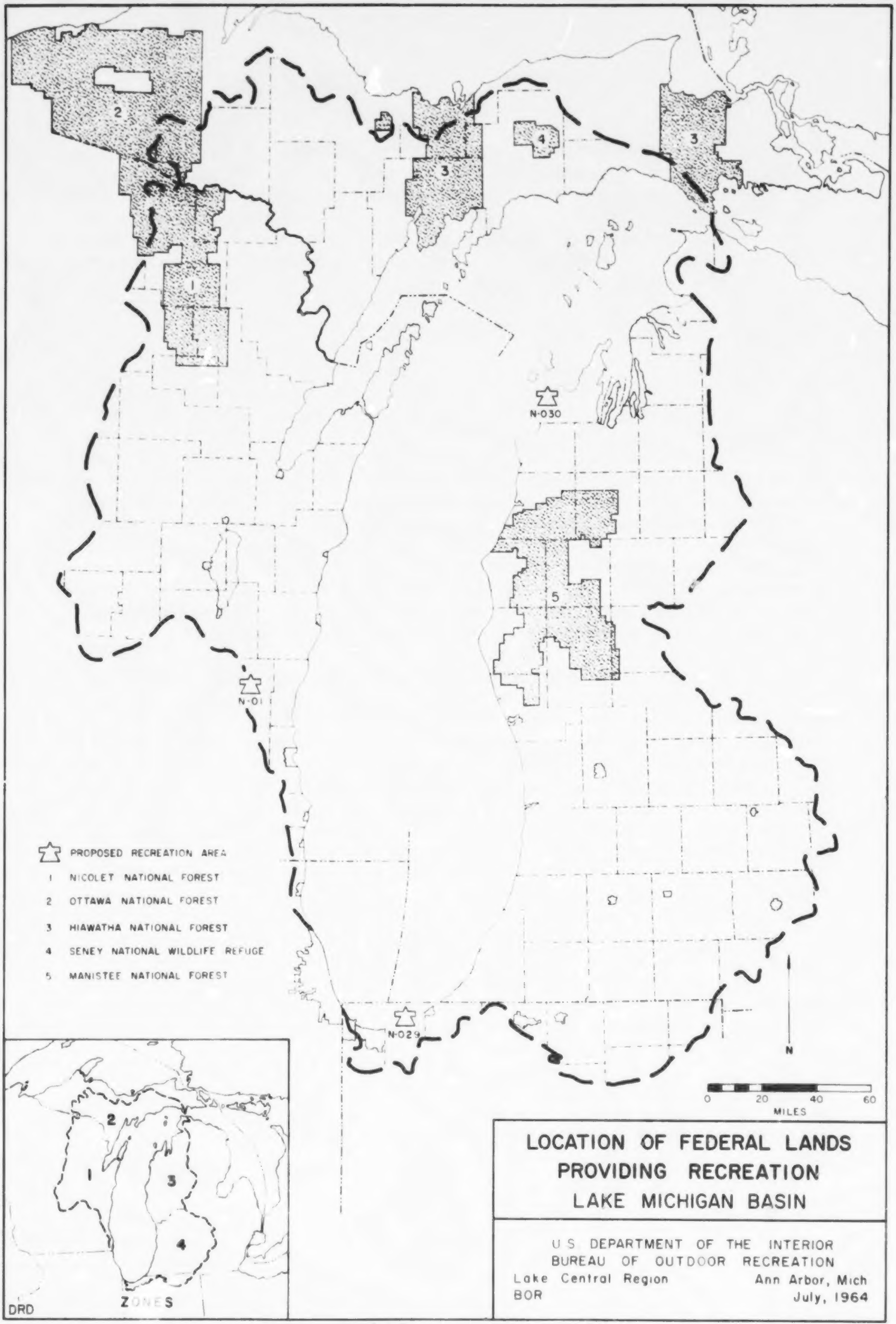
Developed Public Outdoor Recreation Areas

There are 623 public outdoor recreation areas in the Lake Michigan Basin at which facilities of various types have been developed. These areas are administered by Federal, state and local governmental agencies. In addition, there are 107 areas within the Basin administered by state fish and game agencies which offer some types of recreation, particularly fishing and boating. There are also numerous private recreation developments, all of which unite to satisfy much of the pressure of resident recreationists for outdoor recreation. About 87 percent of the public areas are located on either a lake, river, reservoir or the Lake Michigan shore. Appendix A contains an inventory of existing public recreation areas by zones, beginning with Federal developments by the U. S. Forest Service, then state, county and other local recreational developments.

The recreation facilities are indicated together with information on location, size, relationship to water and water activities, camping facilities and other available information. Plates No. 6 through 20 contain maps showing the location of these areas and Table No. 12 summarizes the results of the inventory contained in Appendix A. Altogether, about 4.5 million acres of public land are available for outdoor recreational purposes of various types within the Basin. However, not all of this land has been developed to its optimum. In addition, much of it is so located as to be presently outside the range of usefulness for day and weekend use by the majority of people within the Basin.

The Milwaukee County Park System is the largest county park system in the Basin. It contains 95 parks and 12 proposed park areas containing 12,000 acres of land valued at more than $31 million. The park system controls about 9½ miles of the 27 miles of Lake Michigan shoreline in Milwaukee County. The extent of the system is shown on Plate No. 19.

The system provided about 11.5 million activity days of recreation during 1963, including more than 387,000 visitors to the beaches and about 41,000 boat launchings at park sites.


PROPOSED RECREATION AREA
1 NICOLET NATIONAL FOREST
2 OTTAWA NATIONAL FOREST
3 HIAWATHA NATIONAL FOREST
4 SENEY NATIONAL WILDLIFE REFUGE
5 MANISTEE NATIONAL FOREST
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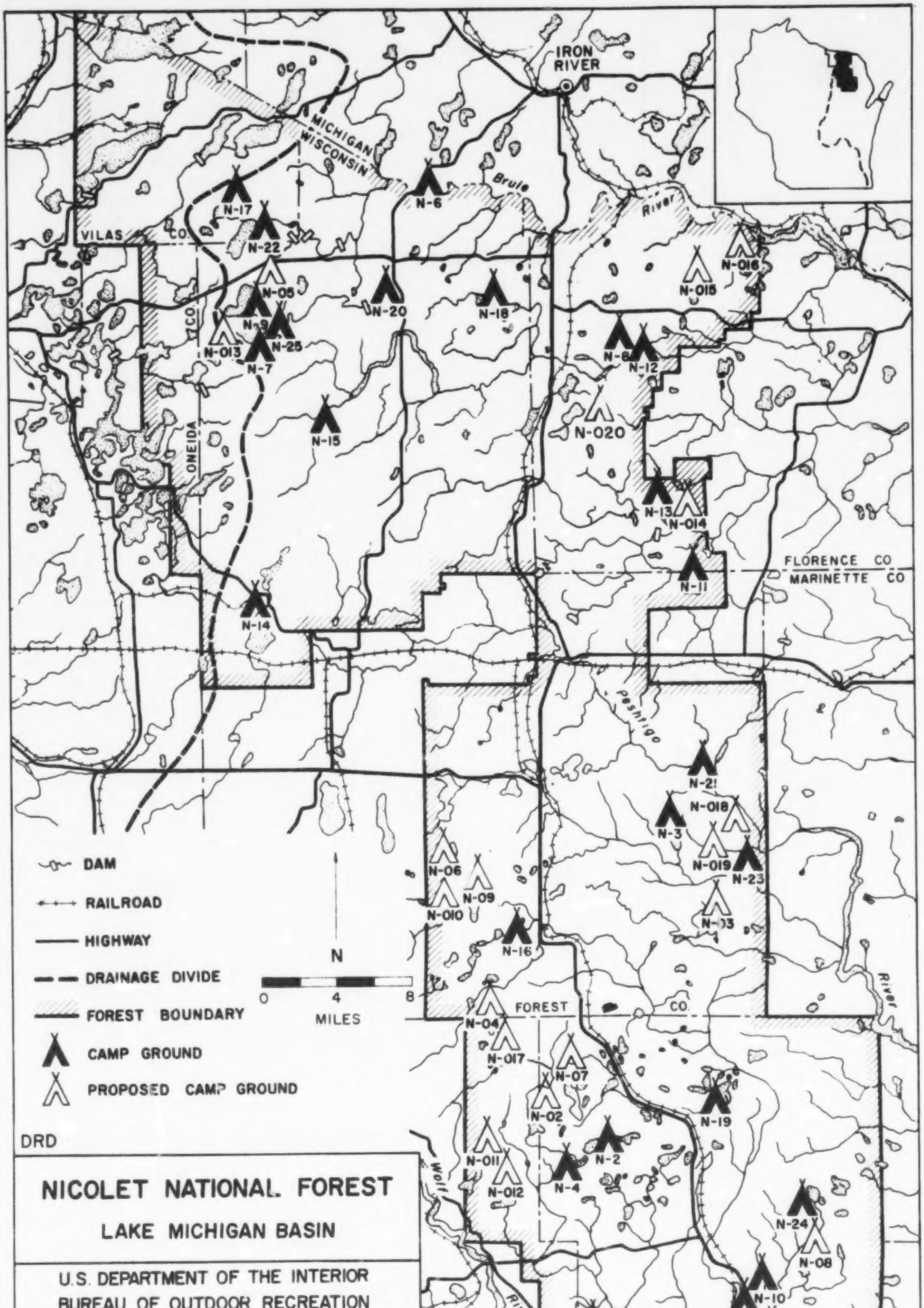
LOCATION OF FEDERAL LANDS PROVIDING RECREATION
LAKE MICHIGAN BASIN

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF OUTDOOR RECREATION
Lake Central Region Ann Arbor, Mich
BOR July, 1964


IRON RIVER
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WISCONSIN
Brule River
VILAS CO
ONEIDA CO
FLORENCE CO
MARINETTE CO
FOREST CO
LANGLADE CO
OCONTO CO
Peshtigo
Wolf River
River
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DRAINAGE DIVIDE
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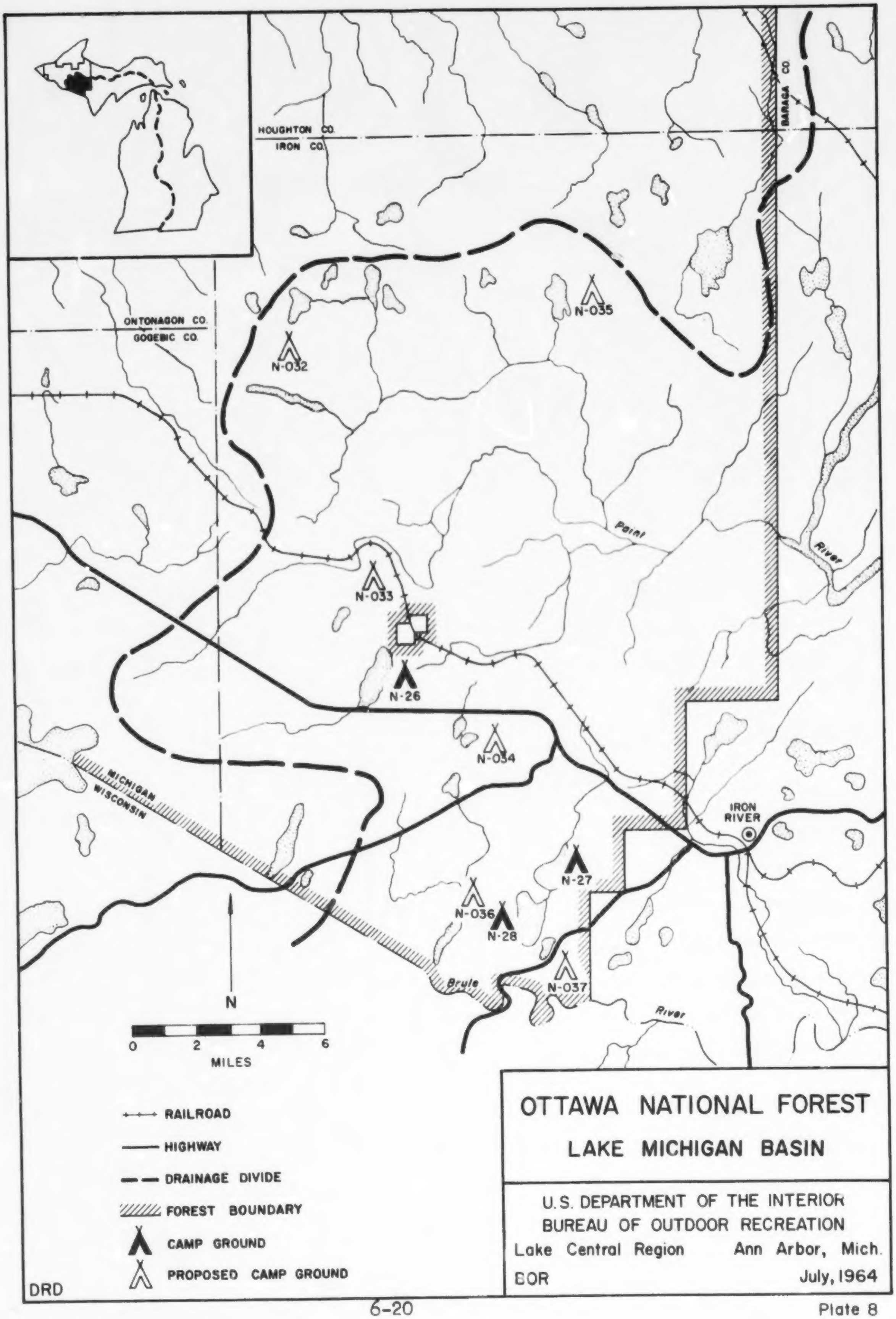
NICOLET NATIONAL FOREST

LAKE MICHIGAN BASIN

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF OUTDOOR RECREATION
Lake Central Region Ann Arbor, Mich.
BOR July, 1964

Plate 7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MICHIGAN
WISCONSIN
IRON RIVER
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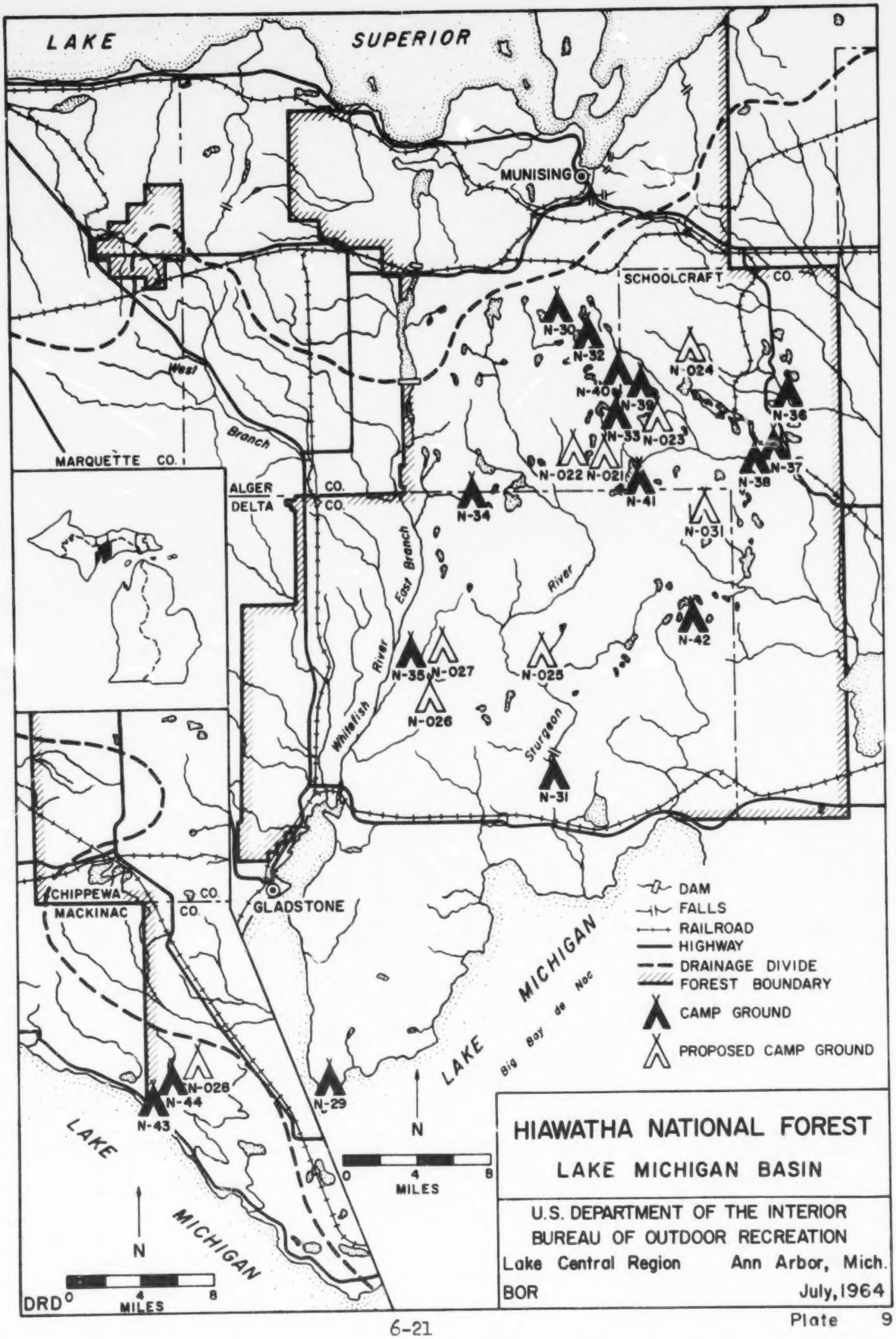
OTTAWA NATIONAL FOREST

LAKE MICHIGAN BASIN

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF OUTDOOR RECREATION
Lake Central Region Ann Arbor, Mich.
BOR July, 1964

Plate 8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ALGER CO.
DELTA CO.
CHIPPEWA CO.
MACKINAC CO.
GLADSTONE
West Branch
East Branch
Whitefish River
River
Sturgeon
LAKE MICHIGAN
Big Bay de Noc
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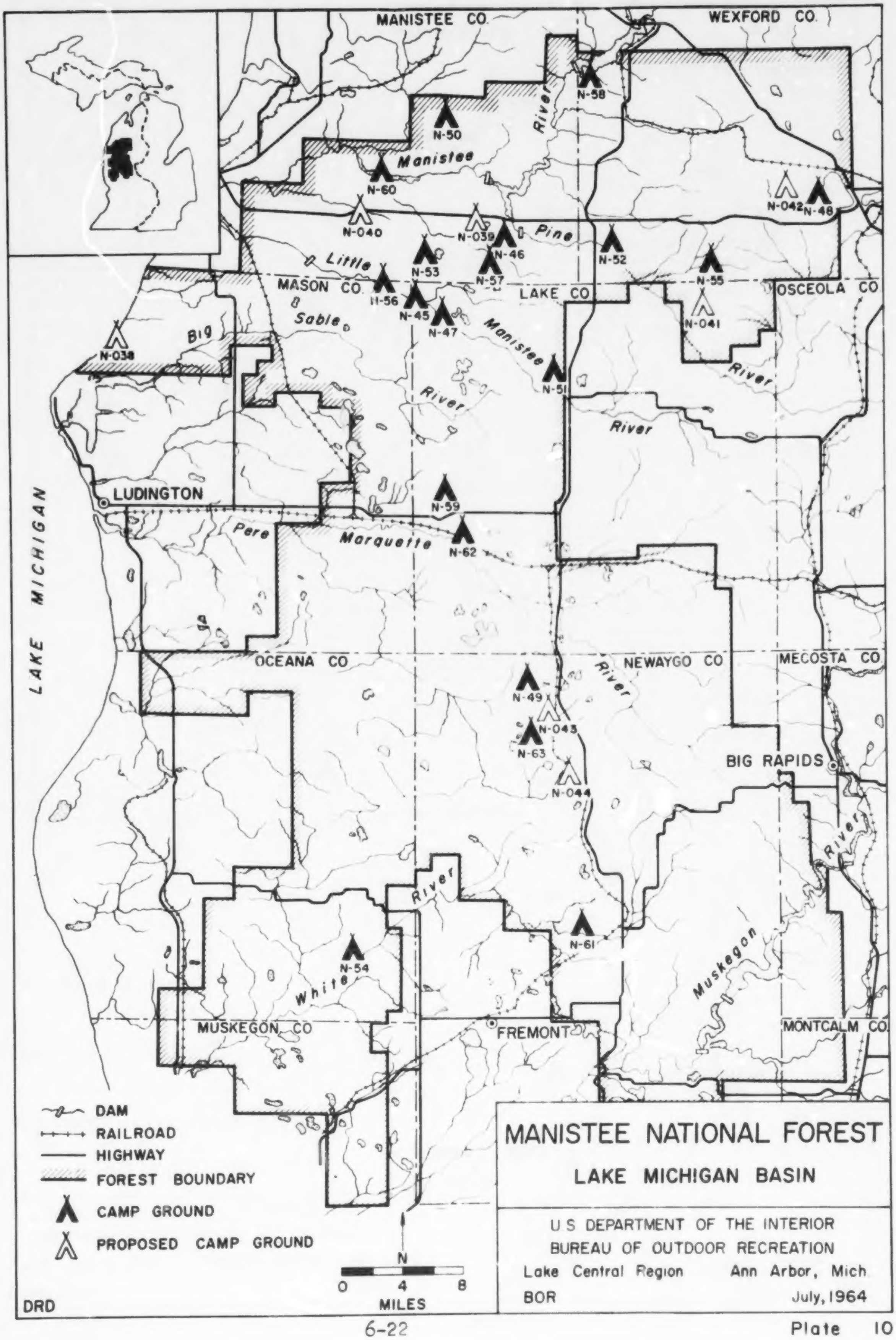
HIAWATHA NATIONAL FOREST
LAKE MICHIGAN BASIN

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF OUTDOOR RECREATION
Lake Central Region Ann Arbor, Mich.
BOR July, 1964

Plate 9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N-50
River
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Pine
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Little
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N-55
MASON CO.
LAKE CO.
OSCEOLA CO
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N-45
N-47
N-041
Sable
N-038
Big
Manistee
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LUDINGTON
LAKE MICHIGAN
N-59
Pere
Marquette
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OCEANA CO
NEWAYGO CO
MECOSTA CO
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River
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BIG RAPIDS
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Muskegon
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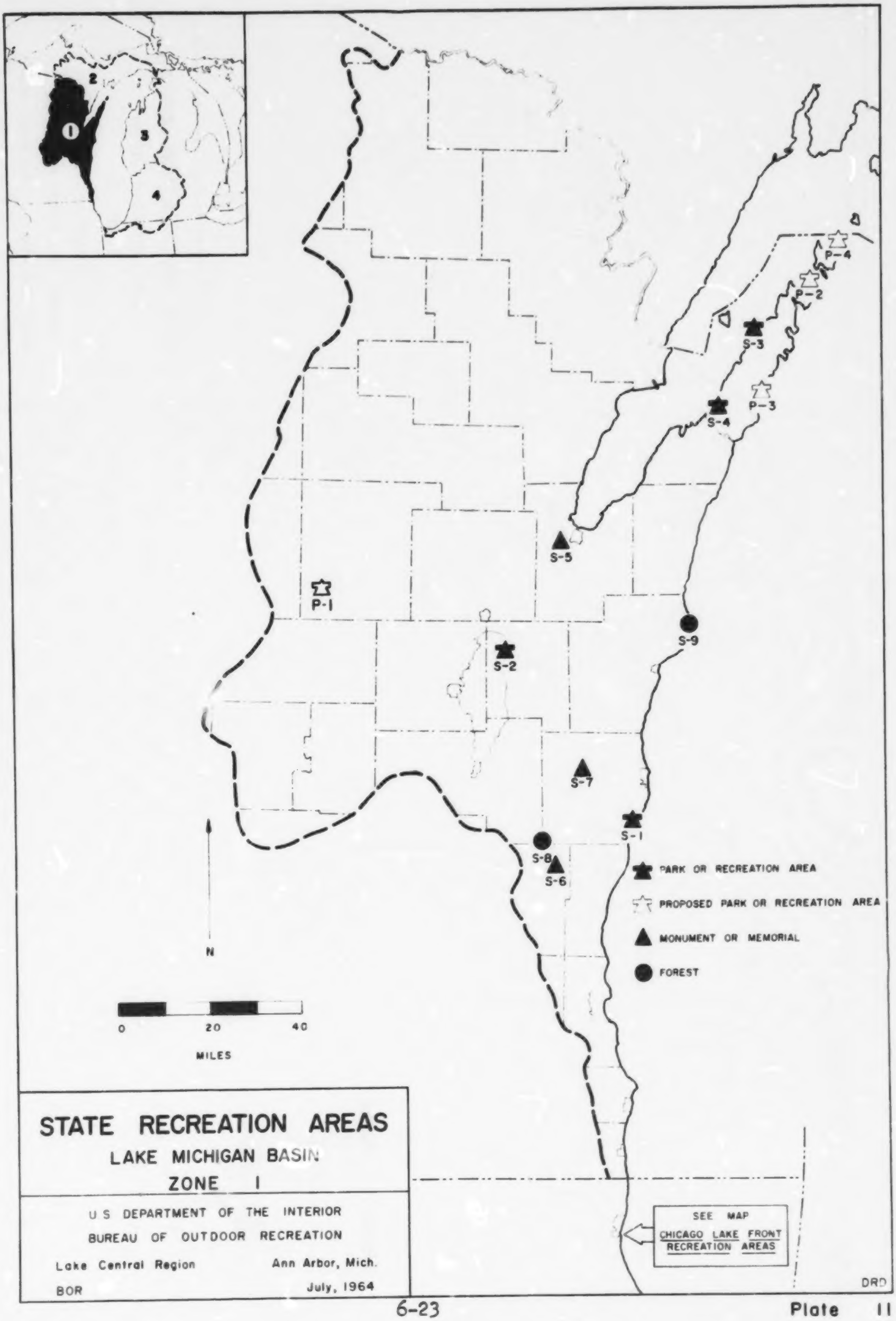
MANISTEE NATIONAL FOREST

LAKE MICHIGAN BASIN

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF OUTDOOR RECREATION
Lake Central Region Ann Arbor, Mich
BOR July, 1964

Plate 10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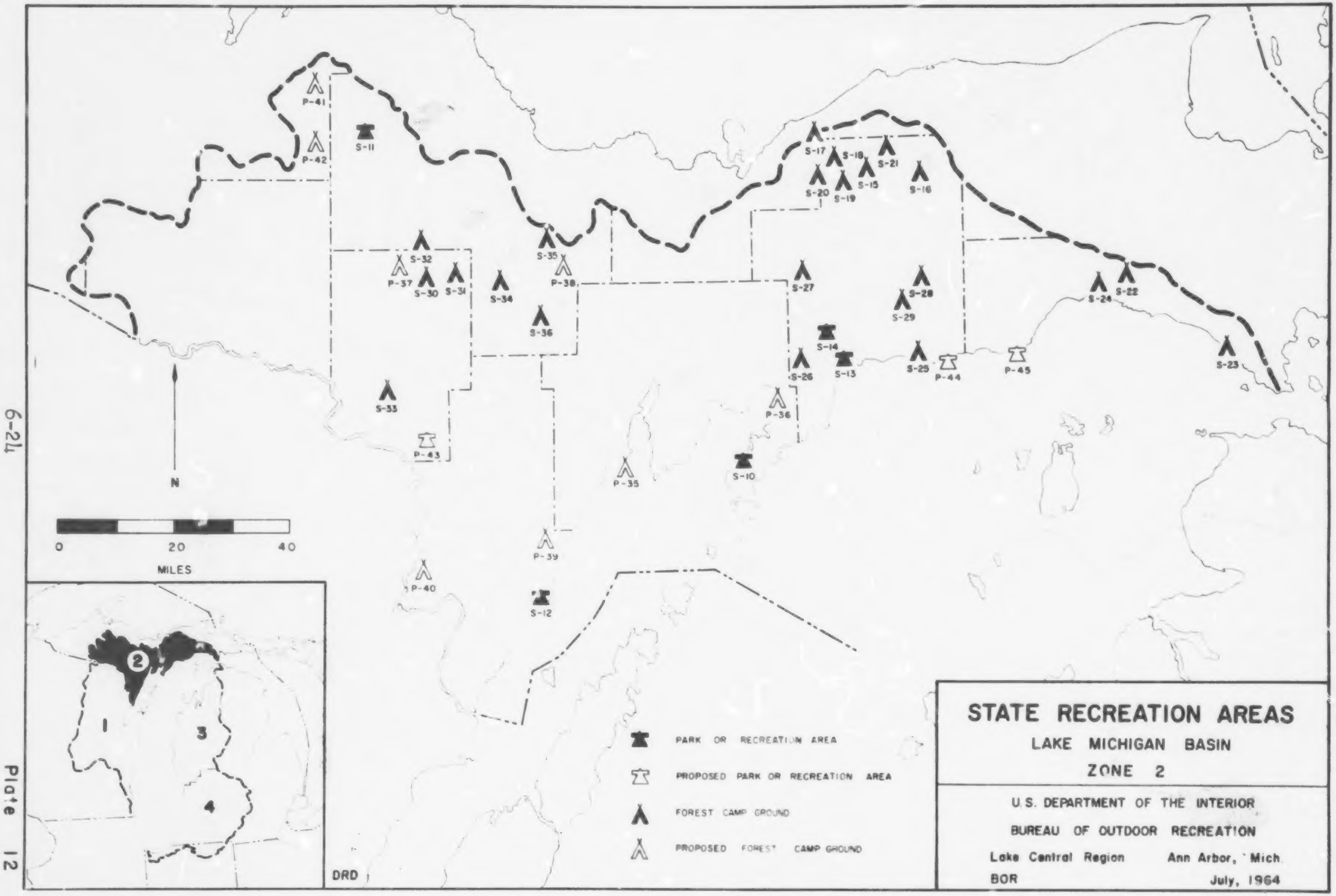
STATE RECREATION AREAS

LAKE MICHIGAN BASIN
ZONE I

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF OUTDOOR RECREATION
Lake Central Region Ann Arbor, Mich.
BOR July, 1964

Plate 11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PARK OR RECREATION AREA
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FOREST CAMP GROUND
PROPOSED FOREST CAMP GROUND

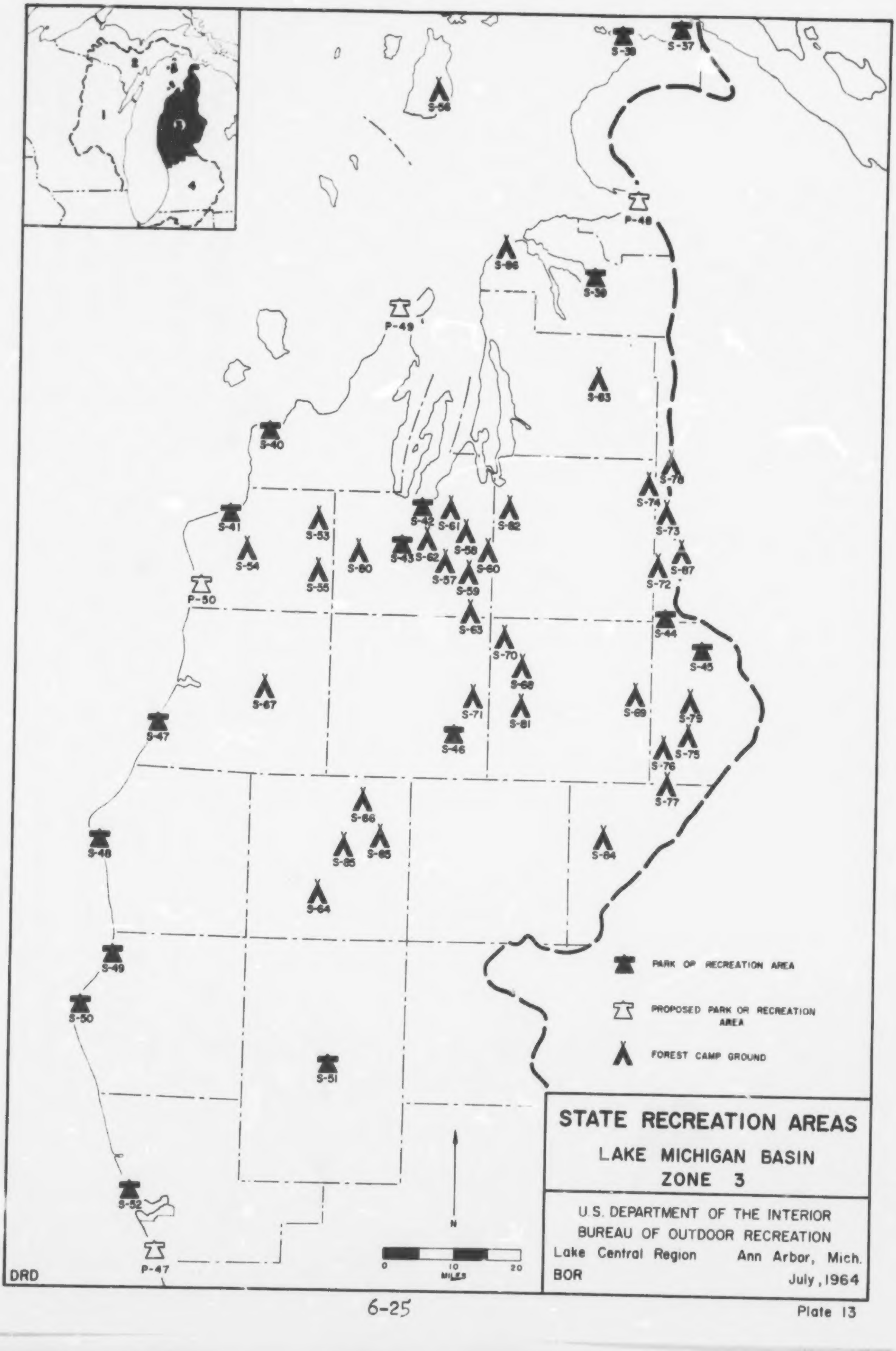
STATE RECREATION AREAS

LAKE MICHIGAN BASIN

ZONE 2

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF OUTDOOR RECREATION
Lake Central Region Ann Arbor, Mich.
BOR July, 1964

Plate 12



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PARK OR RECREATION AREA
PROPOSED PARK OR RECREATION AREA
FOREST CAMP GROUND

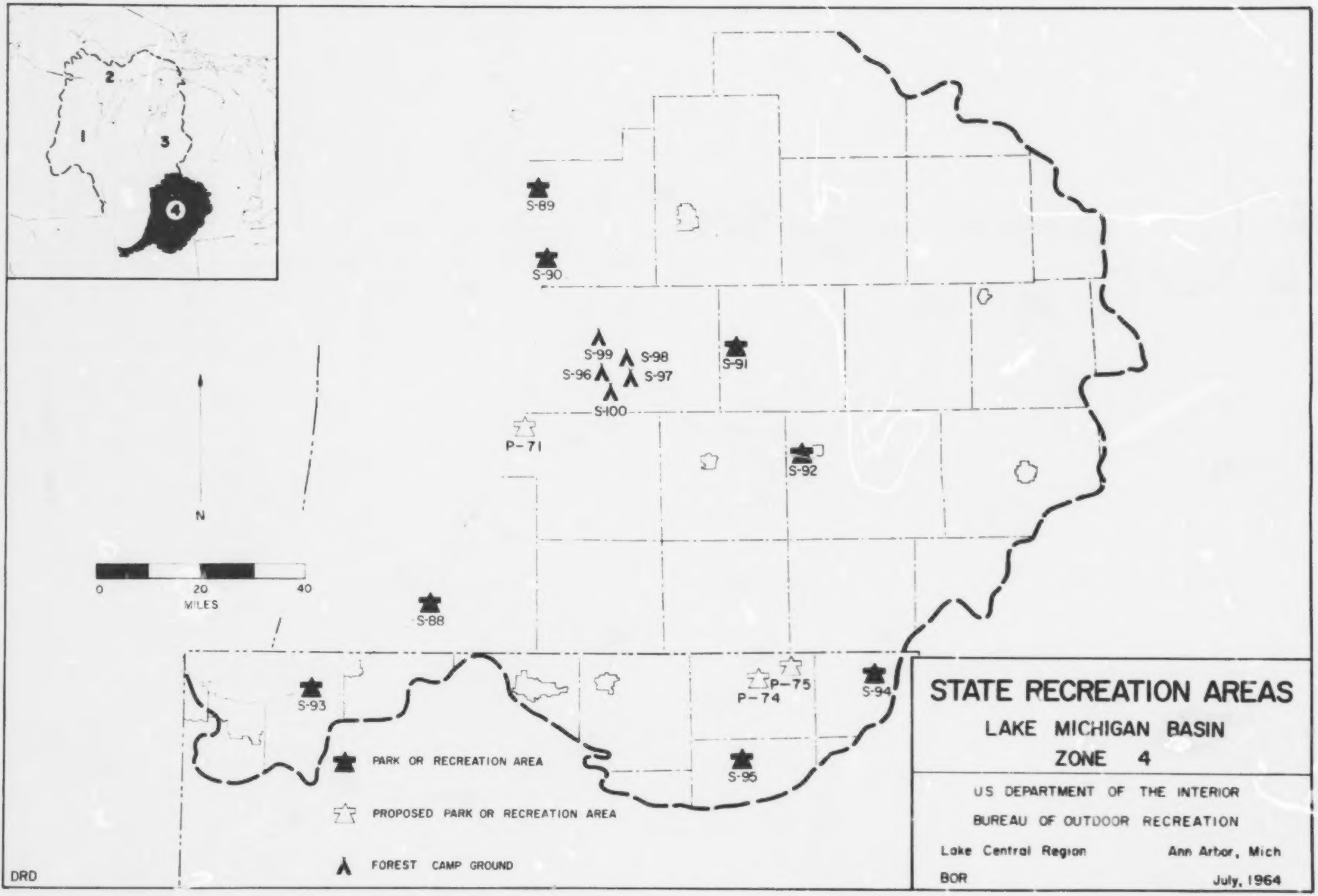
STATE RECREATION AREAS

LAKE MICHIGAN BASIN
ZONE 3

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF OUTDOOR RECREATION
Lake Central Region Ann Arbor, Mich.
BOR July, 1964

6-25

Plate 13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PARK OR RECREATION AREA
PROPOSED PARK OR RECREATION AREA
FOREST CAMP GROUND
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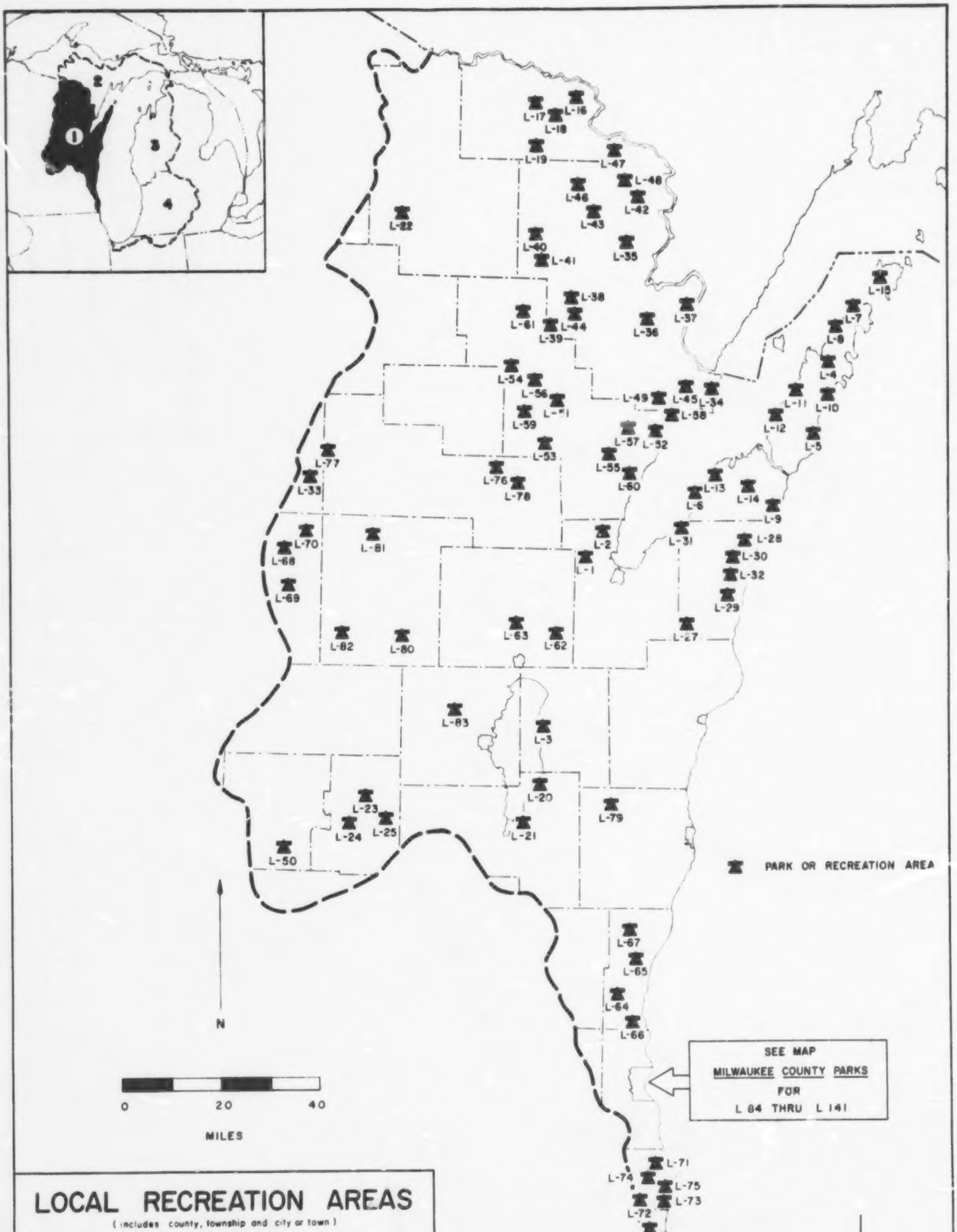
STATE RECREATION AREAS

LAKE MICHIGAN BASIN

ZONE 4

US DEPARTMENT OF THE INTERIOR
BUREAU OF OUTDOOR RECREATION
Lake Central Region Ann Arbor, Mich
BOR July, 1964

Plate 14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PARK OR RECREATION AREA
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SEE MAP
MILWAUKEE COUNTY PARKS
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SEE MAP
CHICAGO LAKE FRONT
RECREATION AREAS
DRD

LOCAL RECREATION AREAS

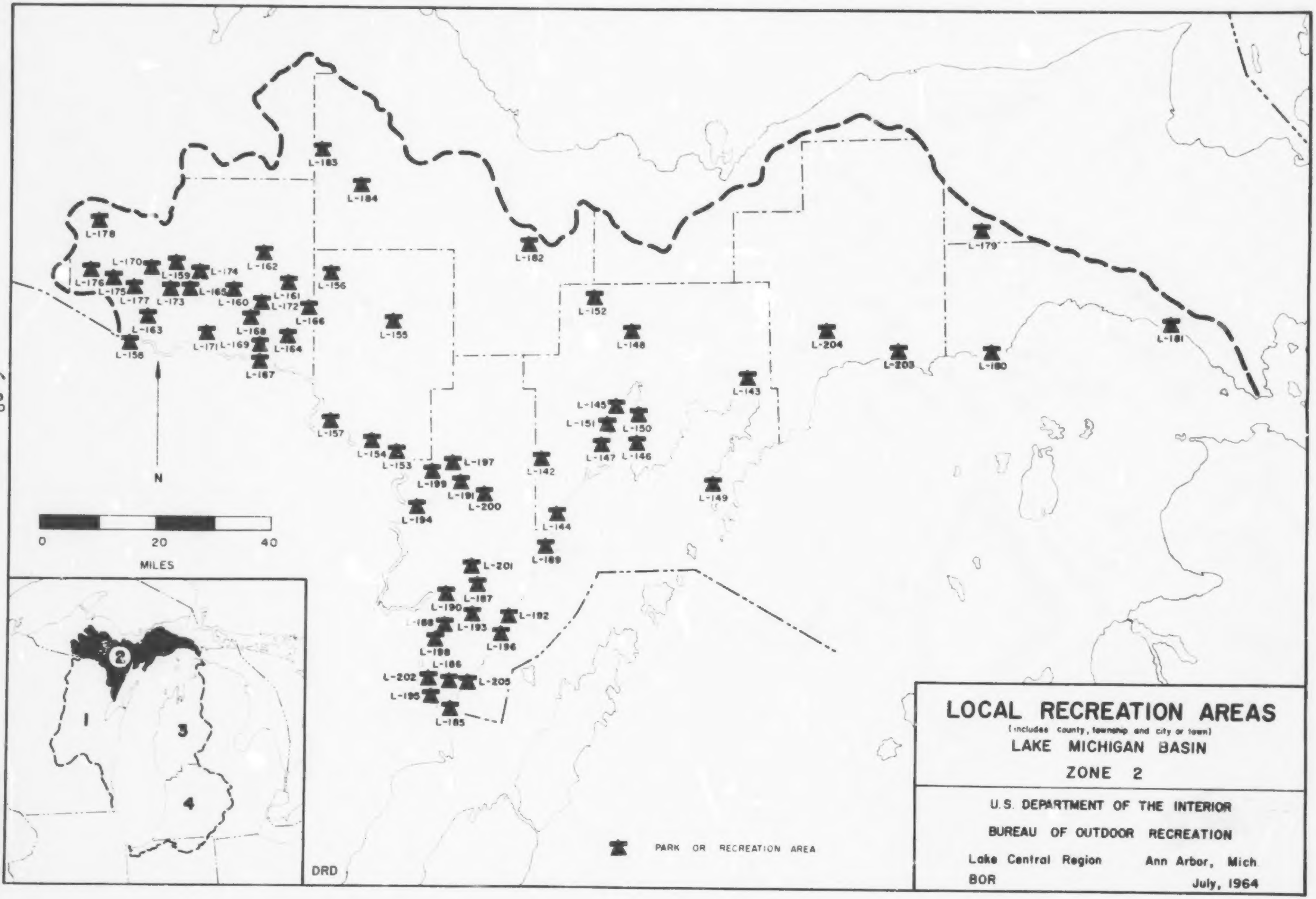
(includes county, township and city or town)

LAKE MICHIGAN BASIN

ZONE 1

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF OUTDOOR RECREATION

Lake Central Region Ann Arbor, Mich.
BOR July, 1964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PARK OR RECREATION AREA

LOCAL RECREATION AREAS

(includes county, township and city or town)

LAKE MICHIGAN BASIN

ZONE 2

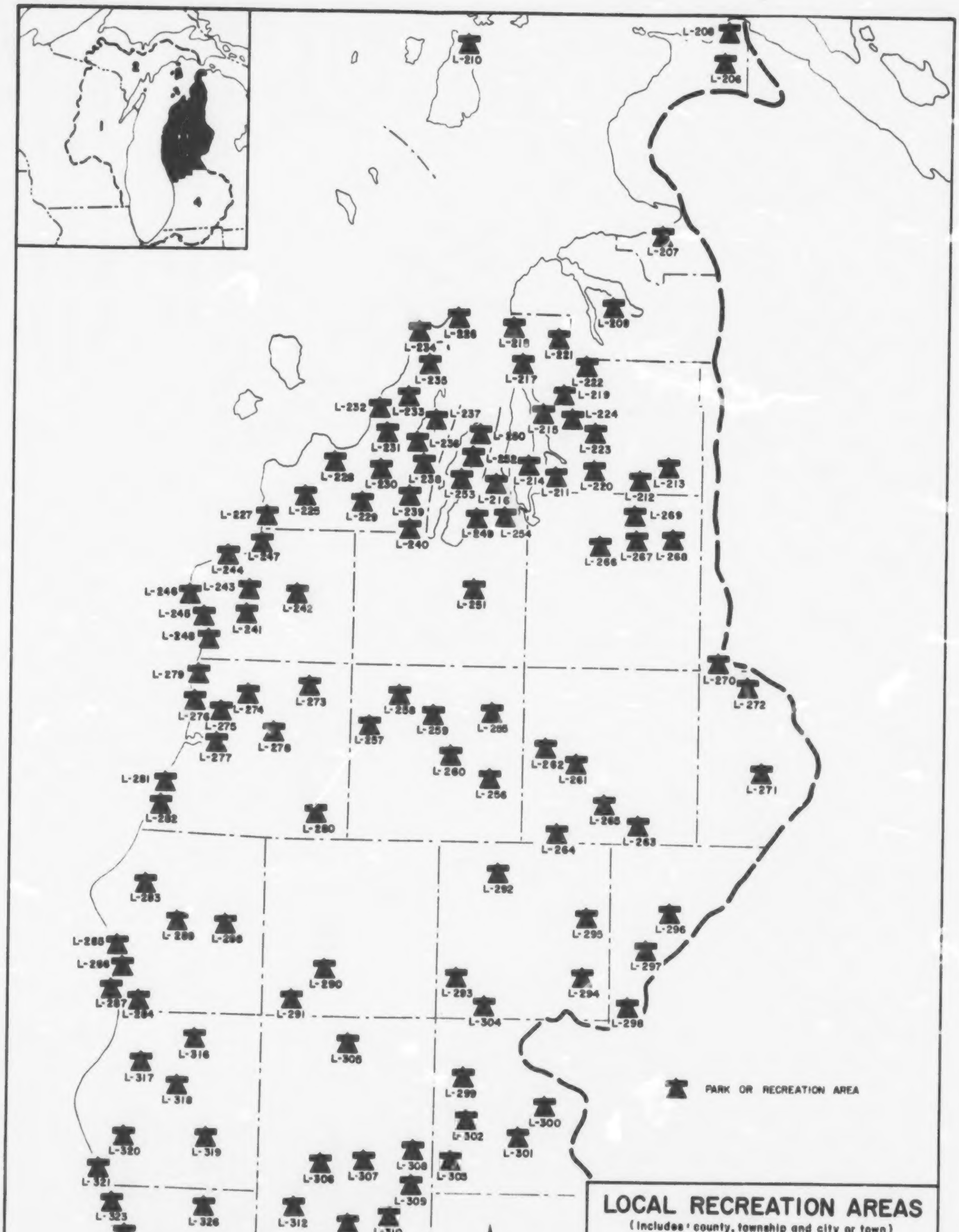
U.S. DEPARTMENT OF THE INTERIOR

BUREAU OF OUTDOOR RECREATION

Lake Central Region Ann Arbor, Mich

BOR July, 1964

Plate 16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PARK OR RECREATION AREA
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0
10
20
MILES
DRD

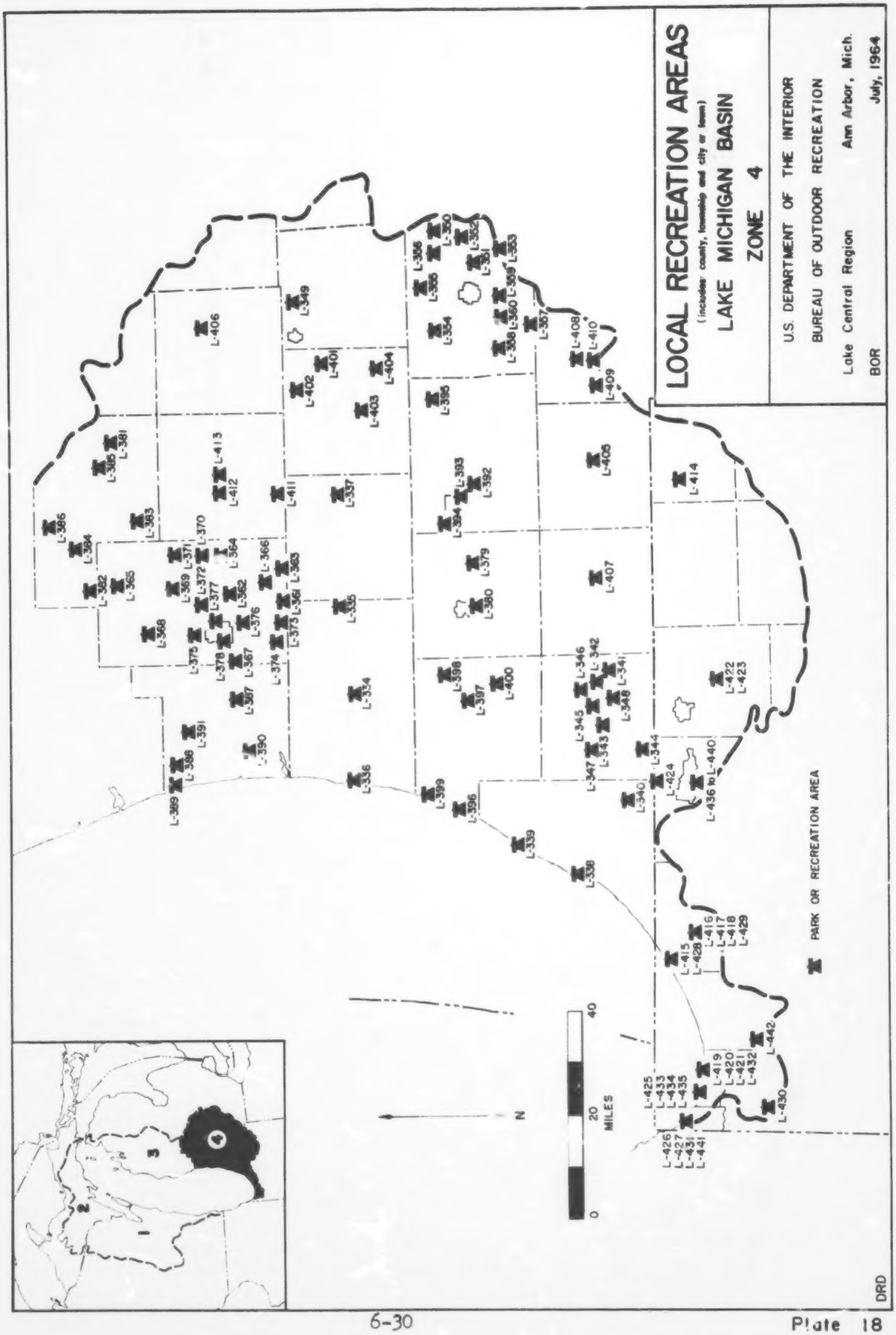
LOCAL RECREATION AREAS

(Includes county, township and city or town)

LAKE MICHIGAN BASIN
ZONE 3

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF OUTDOOR RECREATION
Lake Central Region Ann Arbor, Mich.
BOR July, 1964

Plate 17



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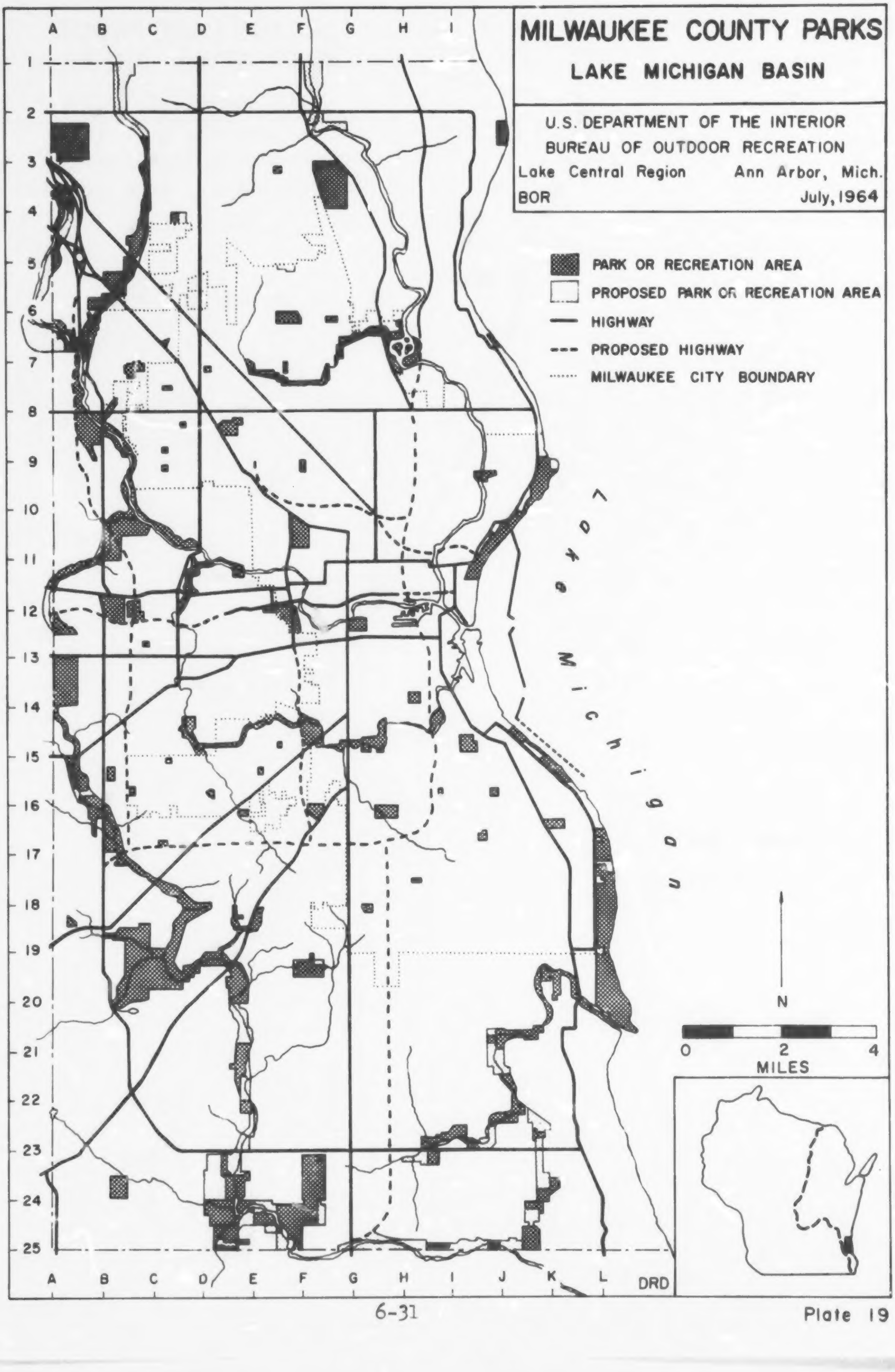
LOCAL RECREATION AREAS
(includes county, township and city or town)
LAKE MICHIGAN BASIN
ZONE 4

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF OUTDOOR RECREATION
Lake Central Region Ann Arbor, Mich.
BOR July, 1964



MILWAUKEE COUNTY PARKS
LAKE MICHIGAN BASIN

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF OUTDOOR RECREATION
Lake Central Region Ann Arbor, Mich.
BOR July, 1964

▨ PARK OR RECREATION AREA
☐ PROPOSED PARK OR RECREATION AREA
— HIGHWAY
--- PROPOSED HIGHWAY
······ MILWAUKEE CITY BOUNDARY
A B C D E F G H I J K L
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Lake Michigan
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0 2 4
MILES
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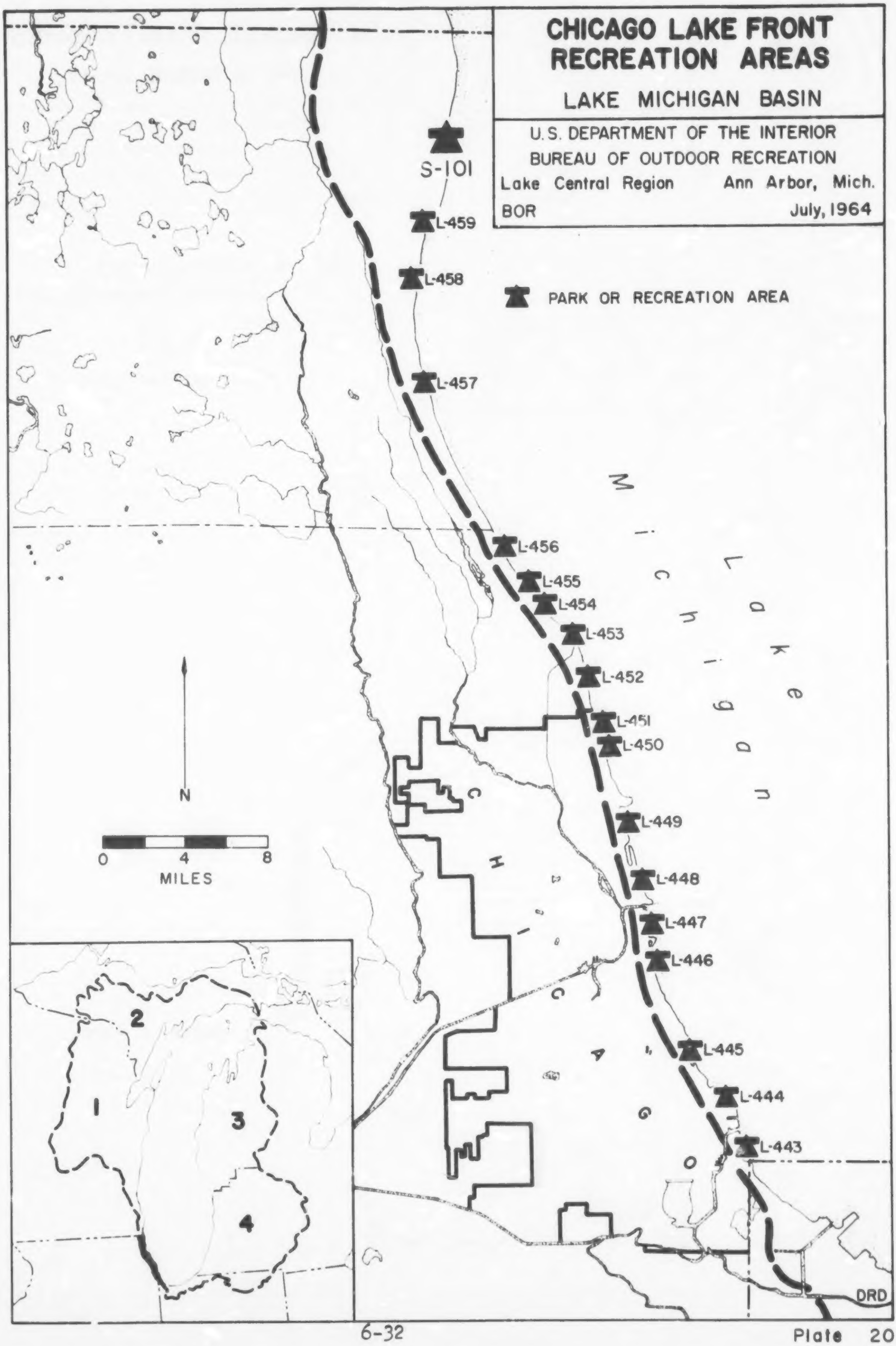
Plate 19



CHICAGO LAKE FRONT RECREATION AREAS

LAKE MICHIGAN BASIN

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF OUTDOOR RECREATION
Lake Central Region Ann Arbor, Mich.
BOR July, 1964

▲ PARK OR RECREATION AREA
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Lake Michigan
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Plate 20

Table No. 12

SUMMARY OF PUBLIC RECREATION AREAS BY ZONE

Administrative Unit	No. of Areas	Developed Acreage	No. Water Oriented	No. With Swimming	No. With Boating	No. With Fishing
ZONE 1						
National	25	99[1]	25	12	25	25
State						
Parks	7	5,601	4	4	3	3
Forests	3	240	3	3	3	3
Local	141	30,100[2]	115	47	45	70
Total	176	36,040	147	66	76	101
ZONE 2						
National	19	82	19	9	16	17
State						
Parks	5	3,042	4	4	4	4
Forests	22	100	22	12	4	22
Local	64	4,600	53	36	21	44
Total	110	7,824	98	61	45	87
ZONE 3						
National	19	80	19	8	12	16
State						
Parks	16	19,370	16	15	12	15
Forests	35	209	33	16	23	30
Local	128	3,175	116	91	73	73
Total	198	22,834	184	130	120	134
ZONE 4						
National	-	-	-	-	-	-
State						
Parks	8	10,156	6	6	3	4
Forests	5	27	1	1	5	5
Local	108	6,598	82	59	24	63
Total	123	16,781	89	66	32	72
Chicago Area						
State Parks	1	1,651	1	1	0	0
Local Parks	17	3,172	17	9	5	5
Total	18	4,823	18	10	5	5
BASIN TOTAL	625	88,302	536	333	278	399

[1] Acreage based on number of camping units per acre for each forest

[2] Acreage based on average acreage of parks for which acreage is known multiplied by number of parks in zone.

Nine parks are located along the shore of Lake Michigan. In some locations these parks are contiguous, making rather extensive areas of lake front available to the public. Seven of the parks have swimming beaches; three of these, South Shore, Bay View and Grant Parks were closed in 1959 due to pollution. Two of the three were reopened in 1963 on a conditional basis and plans are being formulated to open the third beach under criteria established by the Milwaukee Health Department. Grant Park Beach remains closed. Most pollution of the beaches occurs during periods of increased run-off from precipitation. The capacity of the combined sewer system necessitates bypassing treatment plants causing raw sewage to enter the Lake. The Health Department has developed a schedule whereby a beach may be closed for a specific period of time after a rain depending on the amount of precipitation. Milwaukee County beaches have averaged approximately 445,000 activity days of swimming and sun bathing during the period 1958-1963.

The system presently has under development a rather extensive marina at McKinley Park to accommodate local boat enthusiasts. The marina will provide facilities for launching eight boats simultaneously and will ultimately accommodate about 1,500 boats in individual slips. A study conducted by a private firm for the park system recommends ten other sites in addition to the McKinley area for meeting the expanding needs of the boating public. Eleven of the parks in the system have rental boats for use in local lagoons. Such boating accounted for about 77,000 activity days of recreation in 1963.

The park system estimates about 180,000 activity days of fishing. Such fishing is almost entirely for the pan and rough fish varieties. Perch, bluegill and carp are examples.

Recreation Facilities in the Chicago Area

The Chicago Park District is responsible for the development, operation and maintenance of parks, beaches, harbors and other public recreational facilities within the corporate limits of Chicago. Chicago has about 30 miles of shoreline on the Lake, some 24 of which are publicly owned. Virtually all publicly owned lake frontage, with the exception of six small sites devoted to military installations, is developed for public recreational uses. The city is dependent upon Lake Michigan and its shoreline for its principal scenic and aesthetic features.

Among the lakefront recreational facilities operated and maintained by the Chicago Park District are 14 major and 14 secondary or "street end" beaches. The beaches occupy 6.7 miles or 28 percent of the total publicly owned lake frontage. Total attendance at

Chicago's lakefront beaches was 9,499,000 in 1961. In 1960, Chicago had seven boat harbors providing mooring space for 1,881 craft. In addition to the seven harbors operated and maintained by the Park District, the U. S. Coast Guard manages the Grant Park Harbor which accommodates 500 craft.

All of the 1,881 mooring facilities in the Park District's seven lakefront harbors are occupied, and in 1962, 2,435 permits were issued to boat owners for the utilization of eight lakefront boat launching ramps maintained by the Park District. Lakefront parks operated by suburban governments and the Illinois Beach State Park also serve the recreation needs of the Chicago metropolitan area. Chicago area lakefront recreation facilities are shown on Plate No. 20.

Private Recreation Developments

Outdoor recreation areas provided by the private sector are more difficult to inventory than public areas. Various atlases give fairly accurate coverage of private campgrounds providing tent and trailer camping space, but most are incomplete. Private campgrounds usually provide a variety of services and facilities such as water, electricity, toilets, showers, laundry units, etc., and charge a nominal daily fee for these services, usually about $2. The distribution of such campgrounds is tabulated on Table No. 13.

It was estimated that about one-half million people 12 years of age and older participated in camping in the Lake Michigan Basin and that in the process they spent about 3 million activity days during the summer months of June, July and August in 1960. This camping effort was expended at state and National forest campgrounds, local public campgrounds and at private camping areas. Plate No. 21 depicts general distribution of private campgrounds within the Lake Michigan Basin.

Group camps for children and teenagers are very popular in the Basin. Most of these camps are sponsored by organizations, special interest groups or private camps operated for profit. There are 408 known camps in the Basin. Their tabulation by zone can be seen on Table No. 14, and their general distribution is shown on Plate No. 22.

There are literally thousands of private summer resorts in the Lake Michigan Basin. A recent inventory by L. G. Monthley indicates there are about 1,125 in the Wisconsin portion of the Basin alone. They vary from one-four bedroom seasonal establishments to those with more than 30 units operated year round. Several counties:

Table No. 13

DISTRIBUTION OF PRIVATE CAMPGROUNDS

Zone	Campgrounds	No. of Camp Units*
Zone 1	68	2,996
Zone 2	15	402
Zone 3	44	810
Zone 4	76	2,028
Total	203	6,206

*A campground unit is defined as a plot of ground with attendant facilities designed or designated for the accommodation of one camping tent or trailer. It was found that the average private campground contained about 30 units.

Source: 1) Michigan Campground Guide, fourth edition.

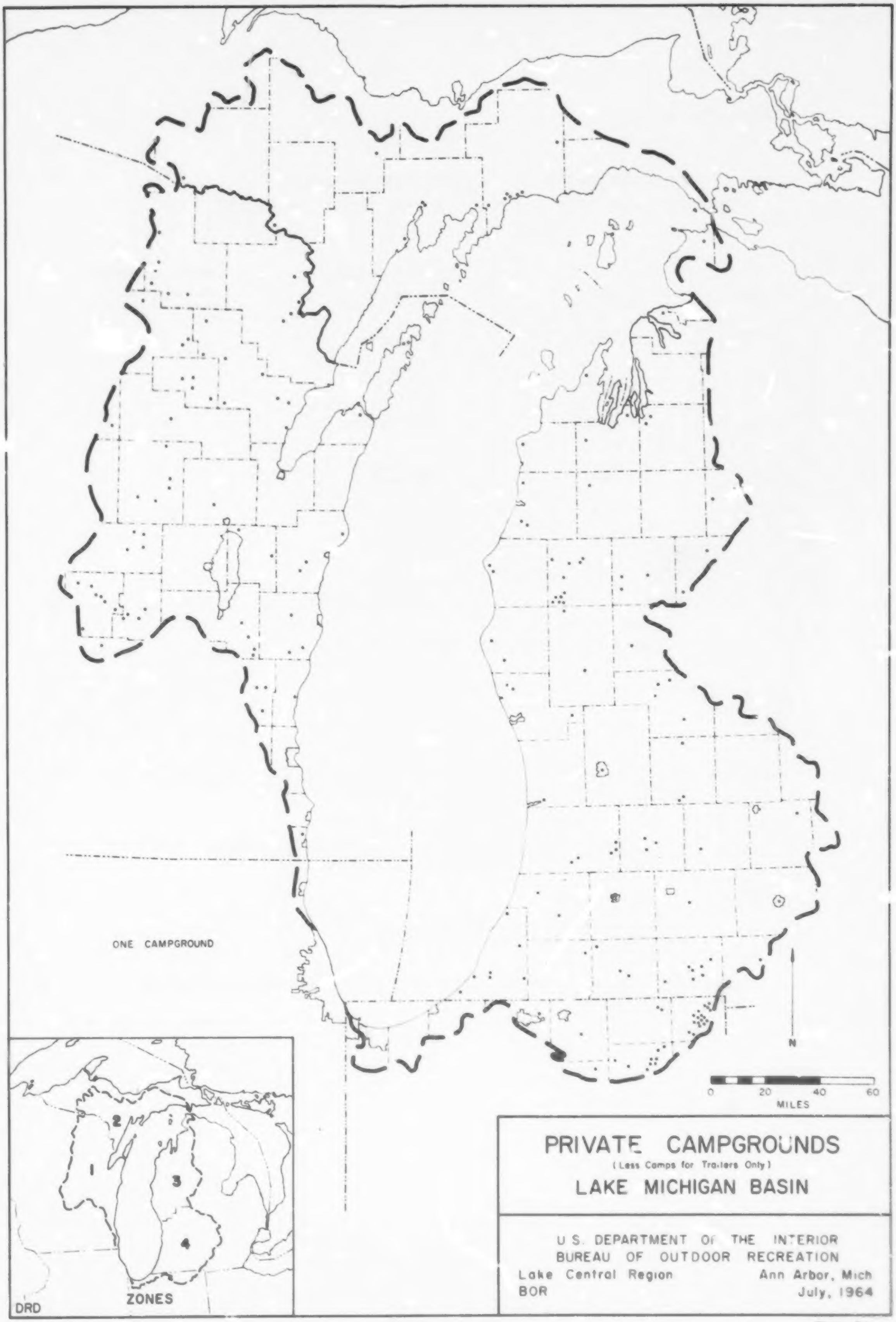
2) Rand McNally Campground Guide, 1960

3) Camping Maps USA, 1962-63 edition

4) Campground Atlas of United States and Canada, Alpine Geographical Press, Champaign, Illinois, 1964

5) Campground Guide, Campgrounds Unlimited, Blue Rapids, Kansas, 1962.

6) Wisconsin Campground Directory, Wisconsin Conservation Department, 1965


ONE CAMPGROUND
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20
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60
MILES
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1
3
4
ZONES
DRD

PRIVATE CAMPGROUNDS

(Less Camps for Trailers Only)

LAKE MICHIGAN BASIN

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF OUTDOOR RECREATION
Lake Central Region Ann Arbor, Mich
BOR July, 1964

Plate 21

Table No. 14

DISTRIBUTION OF PRIVATE GROUP CAMPS
(Summer camps, Boy Scouts, Church camps, Private)

Zone	No. of Camps	Approximate Capacity	Camps located on water[1]
Zone 1	57	8,944	56
Zone 2	29	2,609	29
Zone 3	132	16,374	125
Zone 4	190	22,441	175
Total	408	50,368	385

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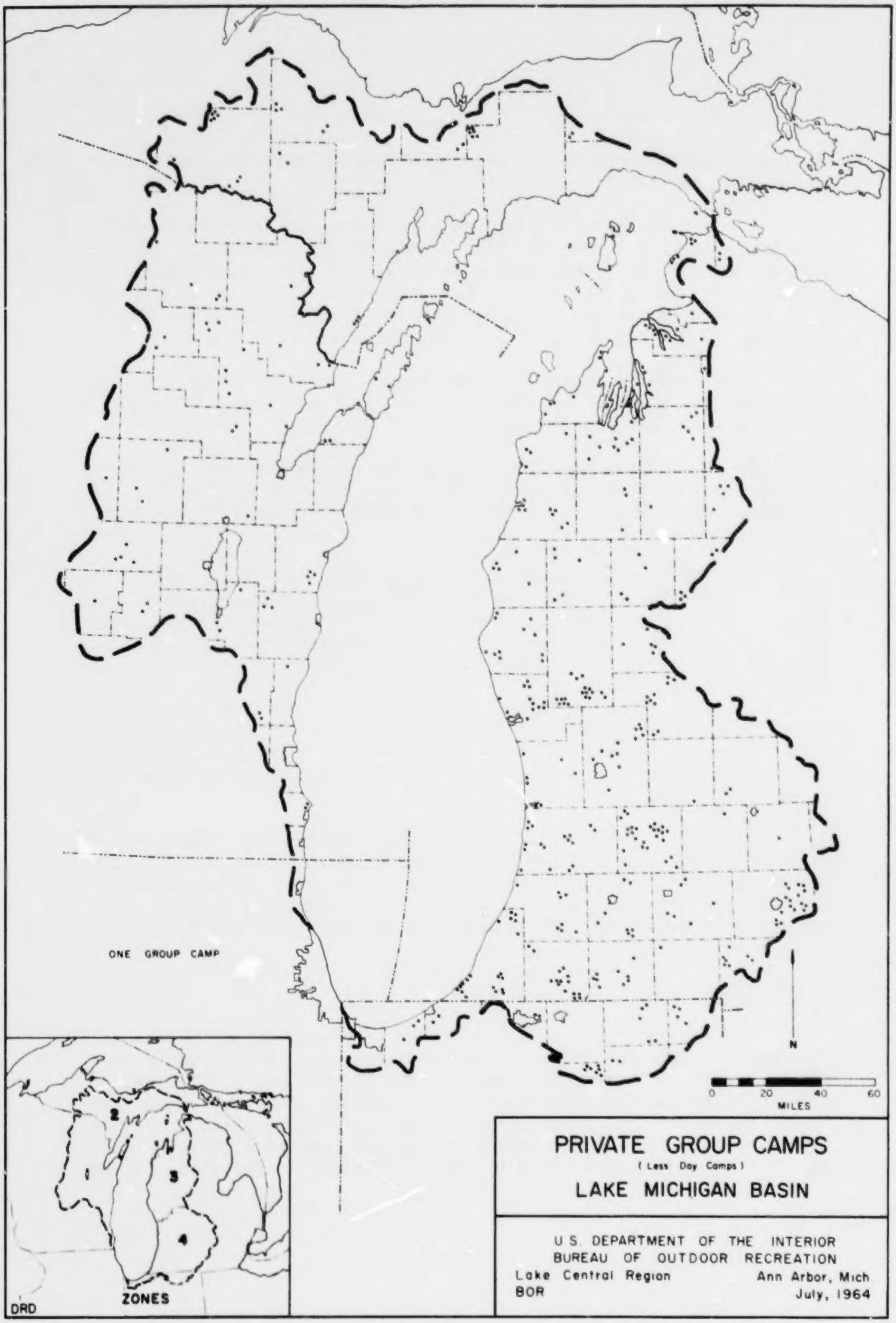
[1] Camping activities include water-oriented activities as swimming and life-saving, boating, canoeing, etc.

Source: Directory of Organized Camps in Indiana, Indiana State Board of Health, June 1963.

Directory of Summer Camps for Children, Department of Social Welfare, State of Michigan, 1963.

Juvenile Camps in Wisconsin, Fine and Werner, University of Wisconsin, 1960

Wisconsin Camping Directory 1964, American Camping Association


ONE GROUP CAMP
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PRIVATE GROUP CAMPS
(Less Day Camps)
LAKE MICHIGAN BASIN

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF OUTDOOR RECREATION
Lake Central Region Ann Arbor, Mich
BOR July, 1964

Plate 22

Outagamie, Ozaukee and Menominee, in Wisconsin have none while Door County has nearly 200.

One of the very few complete inventories of resorts by counties was made in May 1964 by the Oconto County Extension Office, Oconto, Wisconsin. This office cataloged 95 individual resorts in Oconto County which were all located on lakes. There was an average of four units per resort. Eighty reported fishing available, 59 had swimming, 73 had boats and 52 had boat rentals.

Some towns or regions become known as resort areas and concentration is quite heavy. Examples of Michigan areas are Houghton Lake, Traverse City and Charlevoix.

Mr. Monthley's report indicates the resort business is largely a water resource based industry. The more than 4,000 resorts of Wisconsin occupy 450 miles of choice waterfront in that State according to his report.

Very significant changes in the private recreation sector of the Lake Michigan watershed are taking place. Private recreation has long played an important role in the total recreation picture of the watershed. In the past, emphasis in the private sector has been on resorts which catered to people primarily interested in fishing or relaxing. Their season was limited to the traditional vacation months of June, July and August. The tremendous increase in winter sports activities, particularly skiing, has begun to change the seasonal outlook. Other relatively new recreational activities such as water skiing and "scuba" diving are also influencing private recreational enterprises.

A new type of private recreational enterprise known as a "vacation farm" has emerged and is showing limited promise. Such enterprises vary considerably depending on the size and resources of the farm and adaptability of the owner. In general, however, such undertakings cater to the young family unit and try to provide activities interesting to all.

Summer Homes

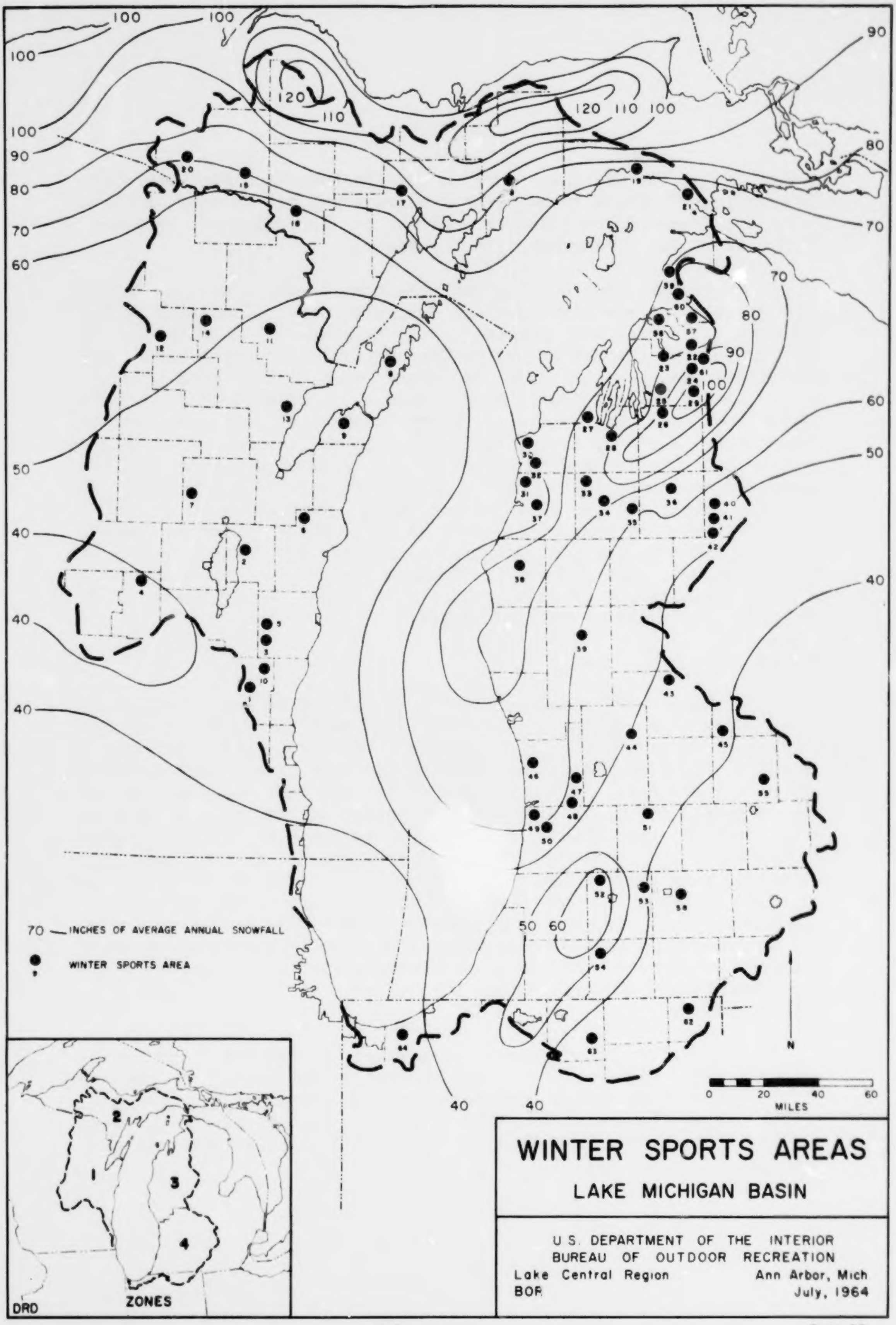
The Lake Michigan Basin is a very important summer home area. Thousands of families from the metropolitan areas to the south have summer residences around the lakes to the north. Dr. I. V. Fine, in a study of summer homes in Wisconsin, indicated there were more than 55,000 in that state. Subsequent information from Dr. Fine indicates there are more than 25,000 summer residences located within the Lake Michigan watershed of Wisconsin. While similar information is not available for the Michigan portion of the Lake Michigan watershed. observations indicate summer cottages are every bit as popular there. Using Dr. Fine's information as a basis, it is estimated there are 70,000 to 80,000 summer homes in the Basin.

The summer-home complex has developed slowly over a period of many years. The earliest cottage dwellers sought isolation in the wilderness. Cabins were placed to keep neighbors at a distance. By the 1930's, the automobile was making access to the north easier and the wilderness began to fade as lands were divided into lots and sold. As our society became more affluent, mobile cottage communities took over many lakes. Every available foot was used to accommodate a cabin, car or boat dock. In some instances, cottages are two and three rows deep. Most of the residences were and are unsewered or connected to septic tanks subject to malfunction or with the tile field too close to the shore. The unplanned development of lake shore communities such as those which surround Shawano and Loon Lakes in Shawano County, Kelly Lake in Oconto County in Wisconsin and Houghton Lake in Michigan has led to visual chaos as well as the upset of natural plant and animal environment which attracted the original cottage owners.

Winter Sports

Although not generally thought of as water oriented, such winter sports as skiing, ice skating and tobogganing do, of course, take place on water in a frozen state. The popularity of winter sports in the Basin is on the increase and they have a very definite economic influence. Skiing appears to be the most popular of the winter sports and this activity has centered around established winter resort areas which are indicated on Plate No. 23 and listed on Table No. 15. While land-based winter sports do not presently appear to have any effect on water quality, it is possible, as the popularity grows, they may have such an influence in the future. As the participants create waste disposal problems in headwater areas, and as run-off patterns are altered, local problems similar to those created by the concentration of pleasure boats around marina areas may precipitate concern about the effect of these activities on water quality.

From winter sports surveys conducted in Wisconsin and Michigan, the Lake Michigan Basin is currently estimated to receive 517,000 visits for winter outdoor recreation purposes. Michigan contributes over 75 percent to this figure. By the year 2010, it is assumed that the Basin visitation for these activities will quadruple. See Figures No. 20 and 21.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70 — INCHES OF AVERAGE ANNUAL SNOWFALL
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WINTER SPORTS AREAS

LAKE MICHIGAN BASIN

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF OUTDOOR RECREATION
Lake Central Region Ann Arbor, Mich
BOR July, 1964

Plate 23

Table No. 15

WINTER SPORTS AREAS - LAKE MICHIGAN BASIN

Number	Name of Area	Lifts and Tows
Zone 1 - Wisconsin		
1	Fox Hill	3
2	Calumet Park Hill	3
3	Ullr Ski Hill	2
4	Frolic Valley	1
5	Greenbush	1
6	Hidden Valley	5
7	View Ridge	3
8	Nor-Ski Ridge	4
9	Potawatomi Park Hill	2
10	Wunderberg	4
11	Fun Valley	2
12	Kettlebowl Hill	2
13	Flats Recreation Area	2
14	Paul Bunyan Winter Sports Area	1
Zone 2 - Michigan U. P.		
15	Crystella Ski Hill	2
16	Pine Mountain	9
17	Gladstone Ski Park	4
18	Thunder Bowl	2
19	Big Valley	2
20	Brule Mountain	4
21	Brice's Hill	1
Zone 3 - Michigan Northern L. P.		
22	Avalanche	6
23	Pleasant Valley	3
24	Boyne Mountain	8
25	Glacier Hills	7
26	Shanty Creek Lodge	4
27	Hickory Hills	7
28	Holiday	9
29	Mt. Mancelona	9
30	Chimney Corners	3
31	Bear Hills	2
32	Crystal Mountain	7
33	Briar Hill	4
34	Caberfae	20

Table No. 15 (con.)

Number	Name of Area	Lifts and Tows
Zone 3 - Michigan Northern L. P.		
35	McGuire's Winter Sports Area	1
36	Missaukee Mountain	3
37	Big M Ski Area	11
38	Ward Hills	1
39	Newaygo Winter Sports Park	1
40	Houghton Lake Snow Bowl	13
41	Snowsnake Mountain	5
42	Major Mountain	4
Zone 4 - Michigan Southern L. P.		
43	Brady's Hills	1
44	Pando Ski Area	3
45	Brock Park	1
46	Grand Haven Ski Bowl	5
47	Indian Hills	0
48	Hu-Lu Heights	1
49	Carousel Mountain	4
50	Goshorn Hills	1
51	Eskar Ski Hills	2
52	Timber Ridge	8
53	Echo Valley	1
54	Little Switzerland	5
55	Lansing Ski Area	4
56	Binder Park	1
57	Petoskey Winter Sports Park	1
58	Mt. McSauba	3
59	Boyne Highlands	2
60	Nub's Nob	7
61	Walloon Hills	3
Zone 5 - Indiana		
62	Tamarack Mountain	2
63	Mt. Wawasee	7
64	The Pines	5

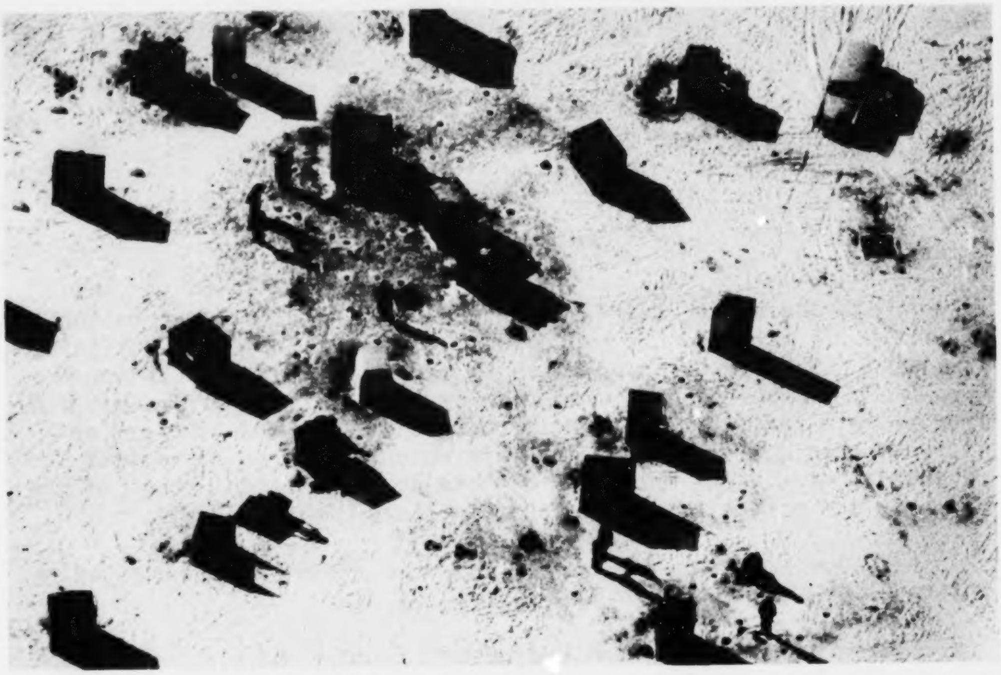


Figure No. 20 Ice fishing on an inland lake of the Lake Michigan Basin. Photo courtesy Michigan Department of Conservation.

Figure No. 21 Skiing, an increasingly popular winter sport in the Lake Michigan Basin. Photo by Bureau of Outdoor Recreation.

PROPOSED AND POTENTIAL RECREATION AREAS

General

With the great surge of interest in outdoor recreational activities in this country has come a number of proposals outlining areas and plans for areas on which to carry out this increased activity. Such proposals have come from every level of government and from private individuals. Some proposals are new and some are actually old ones shelved during the wars which have been dusted off for reconsideration. The following discussion identifies some of the proposed and potential areas within the Lake Michigan Basin.

The general location of the proposed areas is illustrated on Plates No. 6 through 10 and No. 24.

The Federal Government has several areas of high recreation value under consideration within the Basin at the present time.

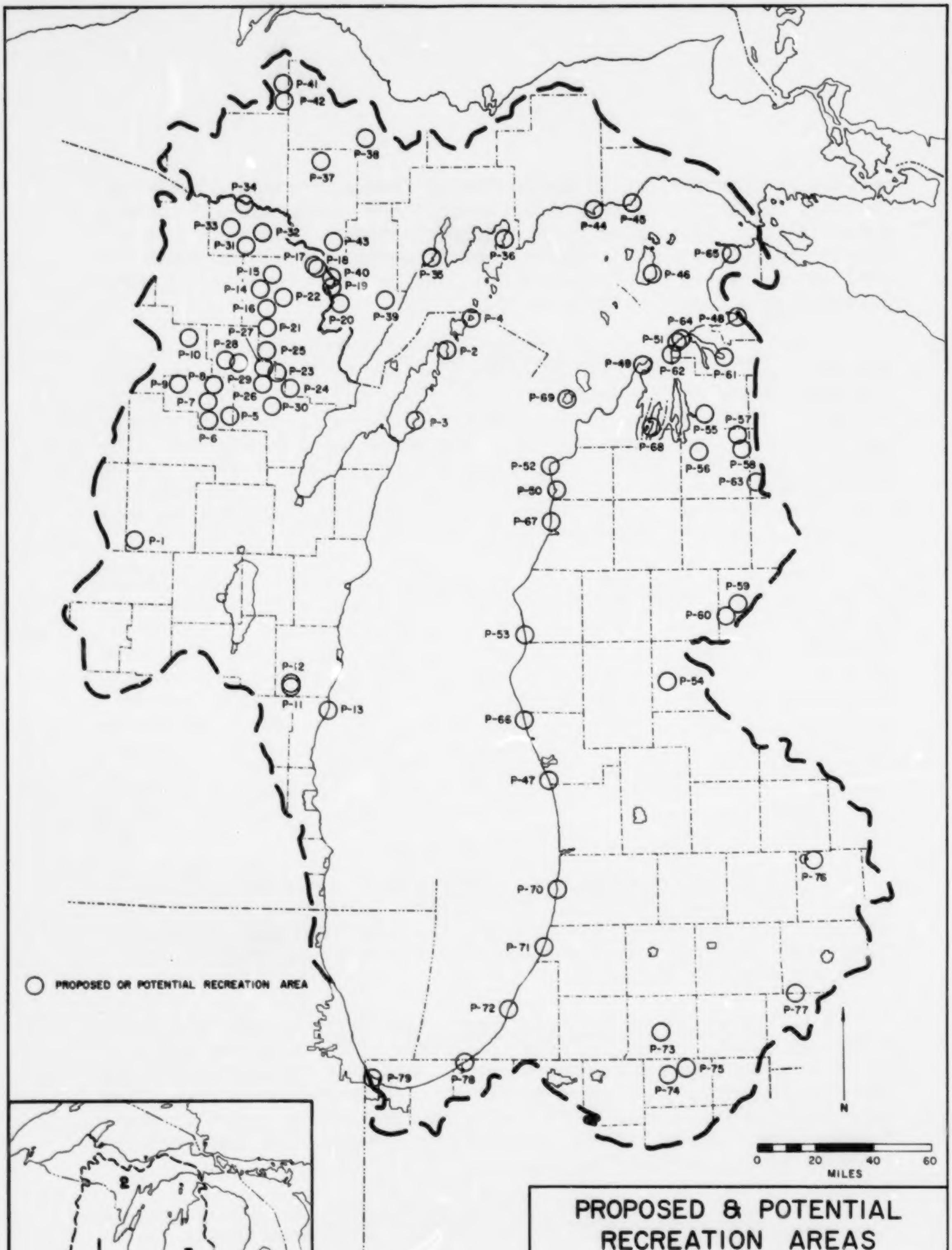
Sleeping Bear Dunes National Lakeshore on the upper eastern shore of Lake Michigan is within a day's drive of over 20 million people. Proposed acquisition consists of approximately 87,000 acres and includes South Manitou Island and about 23 miles of beaches along the bays representing some of the finest beaches on the Great Lakes. Within the embayment lowlands are 19 lakes; the largest and most spectacular of these is the 6,000-acre Glen Lake.

Indiana Dunes National Lakeshore along Lake Michigan in northern Indiana has about 6.5 million people within a 50 mile radius and another three million within the 50 to 100 mile radial zone. Excellent highways make it readily accessible to these people in two hours driving time. The proposal to acquire approximately 11,292 acres includes the existing 2,181 acre Indiana Dunes State Park and about ten miles of excellent sand beach.

Ice Age National Scientific Reserve in Wisconsin would involve a portion of the Lake Michigan Basin. This area is proposed by the National Park Service. While its primary purpose would be to preserve outstanding features of the glacial period, public acquisition of land would provide additional recreation opportunities. The reserve would comprise 32,500 acres, much of which has already been acquired by the State of Wisconsin and would be administered by the State.

Other

In addition to the proposals for new recreation areas, the Federal Government also has made plans for the expansion of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PROPOSED & POTENTIAL RECREATION AREAS LAKE MICHIGAN BASIN

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF OUTDOOR RECREATION
Lake Central Region Ann Arbor, Mich
BOR July, 1964

Plate 24

recreational facilities in areas already Federally owned, namely the National Forest lands. Within the Basin these lands hold outstanding potential for satisfying increasing recreational needs. The Forest Service has plans for development of proposed recreation areas as depicted on Plates No. 7 through 10. The general location of these forests is as shown on Plate No. 6.

The U. S. Army Corps of Engineers is actively engaged in the planning and construction of harbors of refuge throughout the Lake Michigan Basin in cooperation with state and local governments. Ellison and Sister Bays in Door County, Wisconsin, and Cedar River and Cross Village in Michigan are among those being considered. The Corps of Engineers is also undertaking a comprehensive study of the Grand River Basin in Michigan which will include potential reservoir sites that may have recreational value. Initially, more than seventy such sites are being considered.

The U. S. Fish and Wildlife Service operates Seney National Wildlife Refuge, a 95,530 acre area in Michigan's Upper Peninsula, to protect waterfowl and other desirable wildlife species and encourage their reproduction. The refuge is in the Manistique Swamp and most of it is open marsh with immense areas of rushes and sedges. The refuge is open to fishing and much of it is available for bird-watching and nature hiking. The total annual use of the refuge amounts to about 80,000 visitations for various purposes. A potential exists for increased visitation through the development of facilities for recreation purposes. Any plan to encourage recreation use should, however, be compatible with the primary purposes of the refuge.

In 1959, the National Park Service made a recreational survey of the Great Lakes Shoreline. This report identified several areas of potential recreation value along the Lake Michigan shoreline. Their recommendations included the Sleeping Bear and Indiana Dunes proposals and the following:

1. Extension of Illinois Beach State Park to the Illinois-Wisconsin line. The Illinois Department of Conservation also recognizes the tremendous importance of this area in relation to the rapidly increasing population of the Chicago Metropolitan Area. They have recently negotiated additional purchases of land in this area. However, they indicate their acquisition program is hampered by steadily rising acquisition costs.

2. Extension of Terry Andrae State Park in Wisconsin to better accommodate the needs of the metropolitan area to the south.

3. Whitefish Beach is a beautiful area of beach, dunes and limestone caves in Door County, Wisconsin. The State of Wisconsin plans to acquire portions of this area for a state park.

4. Top O' the Thumb area is on the east side of the tip of the Door Peninsula. About ten miles of interesting, largely undeveloped shoreline exists in this area. The State of Wisconsin plans to acquire portions of this area for a state park.

5. Fayette, in the vicinity of the former town by this name, in Delta County, Michigan. The most important part of the recommended area has been acquired by the state and is being operated as a state park.

6. Seul Choix, a point area east of Manistique, Michigan, includes 12 miles of shoreland with beaches and bluffs and a lighthouse. Portions of the area are in Federal and state ownership.

7. Patterson Point, in Mackinac County, Michigan, embraces 12.5 miles of wild and isolated shoreline. About half of it is presently in state forest ownership.

8. U. S. Highway No. 2, west of St. Ignace, Michigan, closely parallels the lakeshore for about 45 miles and is presently a very scenic shore drive. Significant portions of the land along this highway, as well as the beach itself are in National and state forest ownership. However, the scenic and recreational value of this area could be severely damaged by undiscriminating development of land in private ownership.

9. Sturgeon Bay, in Emmet County, Michigan, contains extensive scenic wild shoreline, much of which is in state ownership.

10. Fisherman Island, southwest of Charlevoix, Michigan, involves a small island and about four miles of mainland shoreline. It has a fine beach.

11. Cat Head Bay, on the northern tip of the Leelanau Peninsula, has been in part acquired by the State of Michigan for park purposes. It has a fine beach with low dunes.

12. Betsie Point, located between Crystal Lake and Lake Michigan in Benzie County, Michigan, offers considerable potential for recreational development.

13. Herring Lake, south of Frankfort, Michigan, is an excellent area lying between Herring Lake and Lake Michigan. Most of it is presently in private ownership.

14. Arcadia, surrounding Bar Lake and lying south of the village of Arcadia, Michigan, contains considerable potential for swimming and boating.

15. Bass Lake Dunes, about seven miles south of Ludington, Michigan, is largely undeveloped. The dunes and beach together with the inland lake have considerable recreational value.

16. Flower Creek Dunes, 20 miles north of Muskegon, Michigan, are largely undeveloped. The Dunes would make a very scenic recreational area.

17. County Line area, straddling the Ottawa-Muskegon County line is a massive complex of sand dunes with about 2.6 miles of Lake Michigan shoreline. It has outstanding beaches with many inland sites for picnicking, camping and nature study. The State has acquired a significant portion of this area to relieve crowded condition at other nearby state parks. It will be designated P. J. Hoffmaster State Park.

18. Saugatuck area involves about 2.5 miles of shoreline north of Saugatuck, Michigan, most of which is in private ownership. The City of Saugatuck is presently operating a portion of this area as a park.

19. Thunder Mountain area lies about half way between Benton Harbor and South Haven, Michigan, and includes 1.7 miles of shoreline. It combines many recreational attractions well within the weekend use zone of the metropolitan area to the south.

20. Stevensville area lies about 12 miles north of the Michigan-Indiana state line. The area is presently somewhat broken up by private developments.

The states surrounding Lake Michigan are all actively engaged in developing plans for and procuring new areas to help meet the increased needs of outdoor recreation. Many of the areas recommended by the National Park Service in their report, "Remaining Shoreline Opportunities" published in 1959, are being acquired by the states or other units of government. The Wisconsin Conservation Department currently plans to acquire approximately 670,000 acres. Though the bulk of this land will be used for fish and wildlife areas, lands for other recreational purposes are also included. It is estimated one-third of this acreage will be in the Basin and about 11,000 acres of this will be for parks and other recreation areas. Michigan, Illinois and Indiana also have active programs for acquisition and development of additional recreation areas.

The Michigan Department of Conservation, through its forestry section, is in the process of expanding camping and other recreational facilities on its forest lands. The State of Wisconsin is doing likewise.

The State of Indiana has lands along the Pigeon and Fawn Rivers which may be further developed for outdoor recreational purposes.

The proposed acquisitions and new developments are included on Plates No. 6-10 and No. 24 and are listed on Tables No. 16-18.

As indicated in Water-Oriented Outdoor Recreation in the Illinois River Basin, acquisition of all of the Illinois portion of the Lake Michigan shore for recreational purposes has been recommended. Such acquisition would involve 7,500 acres of shoreline and would make possible the eventual development of a continuous park from Chicago to the Wisconsin line. It would go far toward meeting the day use recreational needs of the Chicago metropolitan area. However, more than 5,000 acres of this proposed area lies south of Illinois Beach State Park. It is composed principally of private shorefront homes, quasi-public and municipal recreation areas, other municipal improvements, Fort Sheridan and the Great Lakes Naval Training Station. Costwise, acquisition of most of this acreage for State Park purposes would be questionable.

Most units of government below the state level have not made extensive plans for future recreational development. New areas and expansion of existing ones are often undertaken as funds permit and where pressures are greatest. There are exceptions, however; several city, county and regional planning authorities within the Basin have developed or are developing plans for acquisition and development of additional recreation areas. Several counties in cooperation with the Wisconsin Conservation Department have identified potential recreation areas within their respective counties. These are included in Table No. 17 and are shown on Plate No. 24. In addition, the Southeastern Wisconsin Regional Planning Commission recently completed an inventory of potential park and open space sites in which over 600 potential sites were identified in seven counties. However, less than one-third of these were found to be of high recreational value and only eight were found to have the criteria required for consideration as a state or regional park. Four of these are located in the Lake Michigan Basin. The City of Chicago has proposed the construction of fingers of land into Lake Michigan for recreational purposes. As mentioned in Chapter 5, the Milwaukee County Park Commission also has plans for further development of parks and marinas in their system. The Land and Water Conservation Fund Act, P. L. 88-578, recently passed by Congress, will enable

Table No. 16

PROPOSED EXPANSION OF THE NATIONAL FOREST RECREATION AREAS

Map No.	Name	County
Zone 1		
Nicolet National Forest		
N-02	Mary Lake	Langlade
N-03	Deer Lake	Forest
N-04	Ada Glade Lakes	Langlade
N-05	Quartz Lake	Forest
N-06	Mayflower Lake	Forest
N-07	Reservoir Pond	Oconto
N-08	Bear Paw Lake	Oconto
N-09	Himley Lake	Forest
N-10	Roberts Lake	Forest
N-11	Jessie Lake	Langlade
N-12	Rose Lake	Langlade
N-13	Butternut Lake	Forest
N-14	Popple River	Florence
N-15	Perch Lake	Florence
N-16	Whisker Lake	Florence
N-17	Hiwanka Lake	Langlade
N-18	Shoe Lake	Forest
N-19	Valley Lake	Forest
N-20	Halsey Lake	Forest
Zone 2		
Hiawatha National Forest		
N-21	Iron Jaw Lake	Alger
N-22	Red Jack Lake	Alger
N-23	Blue Joe Lake	Schoolcraft
N-24	Big Island Lake	Schoolcraft
N-25	Sturgeon River	Delta
N-26	Peterson Lake	Delta
N-27	Haymeadow Falls	Delta
N-28	Brevoort Lake	Mackinac
N-31	Highbridge Lake	Delta

Table No. 16 (con.)

Map No.	Name	County
Zone 2 (con.)		
Ottawa National Forest		
N-32	Forest Lake	Iron
N-33	James Lake	Iron
N-34	Timber Lake	Iron
N-35	Winslow Lake	Iron
N-36	Brule Lake	Iron
N-37	Bennan Lake	Iron
Zone 3		
Manistee National Forest		
N-38	Lake Michigan Sand Dunes	Mason
N-39	Palus Lake	Manistee
N-40	Udell Hills	Manistee
N-41	Silver Creek	Lake
N-42	Old Indian Creek	Wexford
N-43	Bitley	Newaygo
N-44	Loda Lake	Newaygo

Table No. 17

PROPOSED AND POTENTIAL RECREATION AREAS
LAKE MICHIGAN BASIN

Map No.	Name	County
Zone 1		
*N-01	Ice Age National Scientific Reserve	Southern Wisconsin
P-01	Hartmans Creek Area	Waupaca
P-02	Europe Lake Area	Door
P-03	White Fish Bay Area	Door
P-04	Rock Island Area	Door
P-05	Sand Lakes Area	Menominee
P-06	Falls Rapids Area	Menominee
P-07	Wolf River Dells Area	Menominee
P-08	Native White Pine Area	Menominee
P-09	Bass Lakes Area	Menominee
P-10	Wolf River Area	Langlade
P-11	Batavia Creek Area	Sheboygan
P-12	Melunis Creek Area	Sheboygan
P-13	Lake Church Area	Ozaukee
P-14	Mirror Lake Area	Marinette
P-15	Carney Rapids Area	Marinette
P-16	Dolan Lake Area	Marinette
P-17	Smalley Falls Area	Marinette
P-18	Long Slide Falls Area	Marinette
P-19	Pemene Dam Area	Marinette
P-20	Pemene Falls Area	Marinette
P-21	Chauldron Falls	Marinette
P-22	Town Corner Lake	Marinette
P-23	Gilas Lake	Marinette
P-24	Montana Lake	Marinette
P-25	Thunder Lake	Marinette
P-26	White Potato Lake	Oconto
P-27	Ranch Lake	Oconto
P-28	South Branch Oconto River	Oconto
P-29	Oconto River Access	Oconto
P-30	Kelly Lake	Oconto
P-31	Popple River Area	Florence
P-32	Pine River Flowage	Florence
P-33	Lake Patten	Florence
P-34	Brule River	Florence

Table No. 17 (con.)

Map No.	Name	County
Zone 2		
P-35	Portage Bay Campground	Delta
P-36	Bay De Noc Campground	Delta
P-37	O'Neil Lake Campground	Dickinson
P-38	Bass Lake Campground	Marquette
P-39	Big Cedar River Campground	Menominee
P-40	Menominee River Campground	Menominee
P-41	Crooked Lake Campground	Baraga
P-42	Beaufort Lake Campground	Baraga
P-43	Lake Mary	Dickinson
P-44	Seul Choix	Schoolcraft
P-45	Point Patterson	Mackinac
Zone 3		
*N-30	Sleeping Bear Dunes	Leelanau
P-46	Beaver Island	Charlevoix
P-47	P.J. Hoffmaster	Muskegon-Ottawa
P-48	Petoskey	Emmet
P-49	Cat Head Bay	Leelanau
P-50	Herring Lake	Benzie
P-51	Fisherman Island	Charlevoix
P-52	Betzie Point	Benzie
P-53	Bass Lake	Mason
P-54	Big Rapids	Mecosta
P-55	Graves Crossing Campground	Antrim
P-56	Smith Lake Campground	Kalkaska
P-57	Indian Lake Campground	Kalkaska
P-58	Pickrel Lake Campground	Kalkaska
P-59	Pike Lake Campground	Clare
P-60	Mud Lake Campground	Clare
P-61	Walloon Lake Campground	Charlevoix
P-62	Norwood Campground	Charlevoix
P-63	Lake Margrethe Campground	Crawford
P-64	Bells Bay Campground	Charlevoix
P-65	Sturgeon Bay Campground	Emmet
P-66	Flower Creek Dunes	Muskegon
P-67	Arcadia	Manistee
P-68	Marion Island	Grand Traverse
P-69	South Manitou Island	Leelanau

Table No. 17 (con.)

Map No.	Name	County
Zone 4		
*N-29	Indiana Dunes	Porter, Indiana
P-70	Saugatuck	Allegan, Michigan
P-71	Thunder Mountain	Allegan, Michigan
P-72	Stevensville	Berrien, Michigan
P-73	Sherman Hills	St. Joseph, Michigan
P-74	Pigeon River	La Grange, Indiana
P-75	Fawn River	La Grange, Indiana
P-76	Orchard	Ingham, Michigan
P-77	Bunday Hill	Hillsdale-Jackson, Michigan
P-78	West Beach	La Porte, Indiana
P-79	Hammond Area	Lake, Indiana

* Areas of National Significance

Table No. 18

PROPOSED EXPANSION OF EXISTING RECREATION AREAS

Area	County	Present Acreage	Acreage to be added
Zone 1			
Kettle Moraine State Forest	Sheboygan	18,350	13,400
Point Beach State Forest	Manitowac	2,498	500
High Cliff State Park	Calument	494	1,298
Potawatomi State Park	Door	1,046	80
Terry Adnrae State Park	Shegoygan	231	860
Peninsula State Park	Door	3,687	37
Sand Lake Park	Florence	48	100
West Bass Lake	Florence	47	n.a.
Milwaukee County Parks	Milwaukee	12,000	n.a.
Zone 2			
Indian Lake State Park	Schoolcraft	570	n.a.
Van Riper State Park	Marquette	1,046	150
Zone 3			
D. H. Day State Park	Leelanau	2,050	n.a.
Benzie State Park	Benzie	2,255	n.a.
Zone 4			
Indiana Dunes State Park	Porter	2,182	5,000
Pokagon State Park	Steuben	956	n.a.
Chicago Area			
Illinois Beach State Park	Lake	1,651	200

n.a. - not available

local as well as other governmental units to plan for, acquire and develop recreation areas to meet the growing needs by providing matching funds.

Another act, The Housing Act of 1954, as amended by the "Open Space" provisions of the Housing Act of 1961, has been of assistance to state and local governmental units in meeting the expanding recreational needs. Under Title VII, Section 701, of this Act, the Housing and Home Finance Agency is authorized to make grants to local public bodies to acquire land to be used as permanent open space. These grants can cover up to 30 percent of the total cost. This agency is also authorized to award Federal grants to qualifying state, metropolitan, regional and local planning organizations to: 1) aid in solving planning problems resulting from the increasing concentration of population in urban areas; 2) facilitate comprehensive planning for urban development on a continuing basis; and 3) encourage the establishment and improvement of planning staffs at the state and local levels. Grants under this program cover up to two-thirds of the estimated cost of the work for which the grant is made.

Several programs within the Department of Agriculture offer opportunity to realize recreation benefits on formerly active farm lands. The Watershed Protection and Flood Prevention Act as amended (P.L. 566) should prove to be one of the most important authorizing acts available to that department from the point of providing needed outdoor recreation facilities. This Act permits the direct participation of the Federal Government, in cooperation with local interests, in providing recreation facilities in conjunction with other work undertaken under this program.

Wild Rivers

An interagency study team is currently investigating the Nation's need to protect recreation values of a share of its remaining natural and free-flowing rivers. The study grew out of recommendations by the ORRRC and the Senate Select Committee on National Water Resources. The Senate Committee suggested that certain streams be preserved in their free flowing condition because their natural scenic, scientific, aesthetic and recreational values outweigh their value for water development and control purposes now and in the future. Industrial, commercial and other development of the Nation's rivers is on the increase. Once developed, these streams may lose forever the inherent values for outdoor recreation and related values which they now possess. There is an urgent need to identify and preserve a nationwide system of free flowing and undeveloped rivers, or segments of rivers, for their unique outdoor recreation opportunities as well as scientific, historic, aesthetic and symbolic value. Setting aside certain wild rivers for these opportunities and values is as much in the national interest as setting others aside for industrial or commercial purposes. The Wild Rivers Study team's report will explain the need and urgency for wild river protection, identify a considerable number of relatively undeveloped rivers, or segments, with high outdoor recreation potential, evaluate a portion of these rivers in detail, recommend ways to protect them and indicate action required to meet future national needs for wild rivers.

In the initial study, the Manistee River in Michigan and the Wolf River in Wisconsin, both in the Lake Michigan Basin, are to be studied. The Little Manistee, Pine and Pere Marquette Rivers in Michigan and the Oconto, Peshtigo, Popple and Pine Rivers of Wisconsin are others in the Basin mentioned for consideration.

Specialized Recreation

Some types of outdoor recreation develop subtly as an extension or variation of another type. As an example, there has been increasing use of the larger pleasure boats and higher horse power motors over the years as more people have become more affluent. The days of the row boat are fast drawing to a close. The users of the larger pleasure boats find the Green Bay area ideal for their purposes. It is a large enough area to be challenging to their boats and boating ability, yet it is comparatively safer than the main body of Lake Michigan. Thus the Green Bay-Bay De Noc area is becoming a mecca for the weekend sailor. Improved water quality would considerably enhance the recreational potential of the bay. According to Recreation in Wisconsin, published by the Wisconsin Department of Resource Development, the Green Bay area is among the areas most heavily used by Chicago boaters. The report also indicates it is an area needing additional harbors of refuge.

In the development of plans involving proposed and potential areas, the need to meet the resultant increased demands in a particular area for rather specialized outdoor recreation activities must be taken into consideration. In the above instance, plans for the acquisition of such areas as Rock Island and Europe Lake and the development of newly acquired Fayette will considerably enhance this region's attractiveness for pleasure cruising.

NEEDS AND GOALS FOR LANDS AND DEVELOPMENT

By the year 2010 our national population will double and the overall need for outdoor recreation facilities will triple. Not only will there be more people, but they will have more free time, more money and be more mobile than ever before. Already the increase in need for outdoor recreation developments is surging ahead of population growth. The types of outdoor recreation most people take part in today are relatively simple--walking and driving for pleasure lead the list. Swimming, picnicking, fishing and boating are among the most popular. What people do now, however, is not necessarily what they may want to do in the future. The ORRRC report indicates more than 20 percent of those covered by the survey said that while they do not now participate in fishing, they would like to. Other activities for which there is a large unsatisfied desire include swimming, boating and "just going to the beach."

Water is a focal point for outdoor recreation activities. Most people seek water in which to swim or fish; on which to boat; to walk, picnic and camp beside; or just to look at. People also want their outdoor recreation facilities close to home. Two out of three Americans now live in metropolitan areas and by the year 2000, three out of four will. It is here that the need for most types of outdoor recreation is concentrated.

The recreation problem is not entirely one of number of acres, but of effective acres. Most of the acres now designated for public outdoor recreation use are in sparsely settled areas. This situation is very evident in the Lake Michigan Basin where, taken as a whole, there is an abundance of recreation resources in the northern portion of the Basin. See Figure No. 22. Table No. 19 indicates the relationship of public land and water acres to numbers of people in the states of the Lake Michigan Basin.

While acres alone do not tell the whole story, they can be used as an indicator of needs. No universally accepted method of arriving at acreage needs has been adopted, but several agencies, such as the National Park Service and the National Recreation Association, have developed guidelines based on per capita needs. Using such criteria, Table No. 20 was developed to show present recreation needs within the Basin. For comparison, the extent of existing areas is also shown. The needs have been divided into the three categories suggested by Marion Clawson, et al., in their publication entitled, Land For The Future. User-oriented parks are represented by city, county and other local-type parks which are usually located near the user, irrespective of the quality of resources available. User-oriented areas may be compared to Class I--High Density Recreation

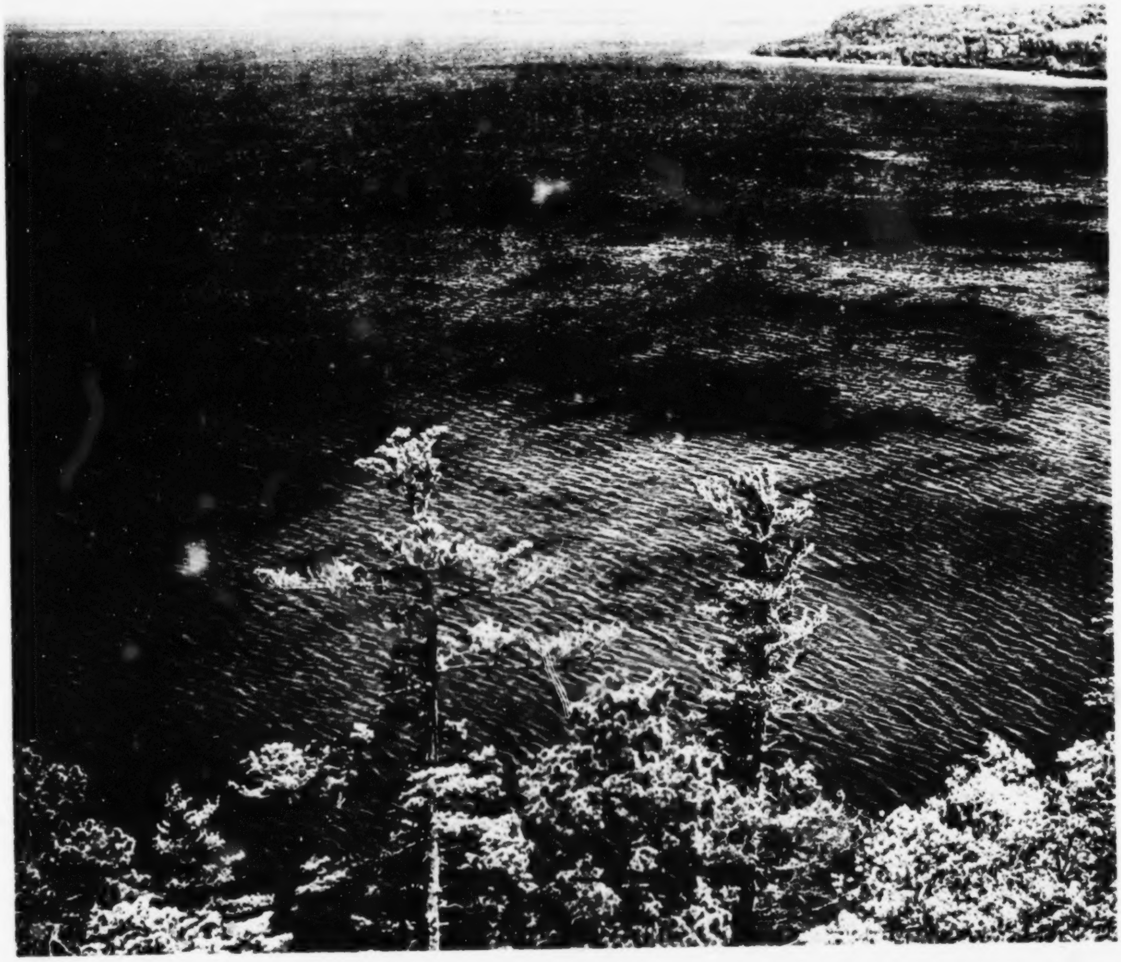


Figure No. 22 Many areas of high recreational value, as yet undefiled by pollution, remain in the northern Lake Michigan Basin. Photo courtesy Wisconsin Department of Conservation.

Table No. 19

RELATIONSHIP OF STATE POPULATIONS TO PUBLICLY OWNED LANDS FOR FOREST AND WILDLIFE, WATER AND GREAT LAKES SHORELINE
(1960)

State[1]	Pop. (Mil.)	State, Federal Owned Land for Forest and Wildlife (acres)	Forest & Wildlife Land Per Cap.	Water[2] Acres	Water Acres Per Cap.	Great Lakes Shoreline Miles	Shoreline Miles Per 1,000 Persons
Illinois	9.9	272,000	.027	1,280,000	.129	63	.006
Ohio	9.3	[illegible]	.033	2,368,000	.255	312	.034
Michigan	7.9	6,476,000	.820	25,472,000	3.224	3,288	.416
Indiana	4.6	244,000	.053	192,000	.042	45	.010
Wisconsin	3.9	2,084,000	.534	7,360,000	1.887	820	.210
Total	35.6	9,383,000	.263[3]	36,672,000	1.030[3]	4,528	.127[4]

[1] The population of the five states approximately equals 20 percent of the total population of the United States. Each of these states is a "Heavy Market" state for Basin visitors.

[2] Includes portions of the Great Lakes in the States.

[3] Average per capita for five state area.

[4] Average per thousand persons for a five state area.

Table No. 20

RECREATION NEEDS
Needed Supply Compared With Existing Supply

Zone	Resident Population: 1960 1/	User Oriented 3/ (County and Local Parks)		Intermediate 3/ (State Parks and Recreation Areas)		Acreage Deficit	
		Needed Acreage for Zone Pop. 2/	Existing Acreage	Needed Acreage for Zone Pop. 2/	Existing Acreage	User Oriented	Intermediate
1	1,951,000	39,020	29,660	140,000	26,449	9,360	113,551
2	172,000	3,440	4,690	11,000	3,170	(1,250 surplus)	7,830
3	424,000	8,480	3,070	28,000	19,580	5,410	8,420
4	2,755,000	55,100	5,570	177,000	10,180	49,530	166,820
Basin	5,302,000	106,040	42,990	356,000	59,379	63,050	296,621

1/ Source: U. S. Bureau of the Census.
2/ Source: National Park Service; National Recreation Association.
3/ Marion Clawson, et al., Land for the Future, . 136.

Areas--as defined in Outdoor Recreation for America by ORRRC. Intermediate parks are represented by state and regional type parks which utilize the best available resources within a reasonable distance of the user.

Intermediate areas may be compared to Class II--General Outdoor Recreation Areas--as defined by ORRRC. To some extent intermediate areas may also include the more highly developed Class III areas as defined in the above publication. The third category, resource-oriented, is represented by National Parks and Forests located in areas of outstanding resources. Since the latter type is based on location of resources and not necessarily on peoples' needs, it is not included in the Table. It is an important category, however, and at present is represented in the Basin by the four National Forests.

A survey on the origin of state park users conducted by the State of Wisconsin indicated non-resident use to be 37 percent of total visitation. Non-resident use of Michigan state parks is estimated to be about 30 percent; therefore, the needed acreages for intermediate parks in each zone has been adjusted to meet this additional demand.

The figures presented indicate there is a considerable shortage of recreational opportunities, particularly in Zones 1 and 4. However, Basinwide, this gap is partially filled when the potential of National, state and county forest areas, totaling about 4.5 million acres, is considered. The most critical present need is for the acquisition and development of day-use facilities and areas in the southern portion of the Basin. See Figure No. 23. Acquisition and development of the proposed Indiana Dunes area would help to meet this need as would acquisition and development of other areas which have been proposed by various state and local agencies.

Michigan and Wisconsin are also among the inland states having the most favorable potential for meeting the future recreational needs for water-oriented activities. Inland lake area amounts to about 0.13 acres per capita within the Basin as compared to the State of Illinois which has only 0.0175 acres of inland water per capita.

All levels of government are presently striving to catch up by increasing the capacity of existing areas and developing new ones.

In addition to the need for acquisition and development of suitable public recreation areas close to population concentrations in the Basin, there is a need to acquire and develop areas possessing unique scenic, geological and biological features as well as other

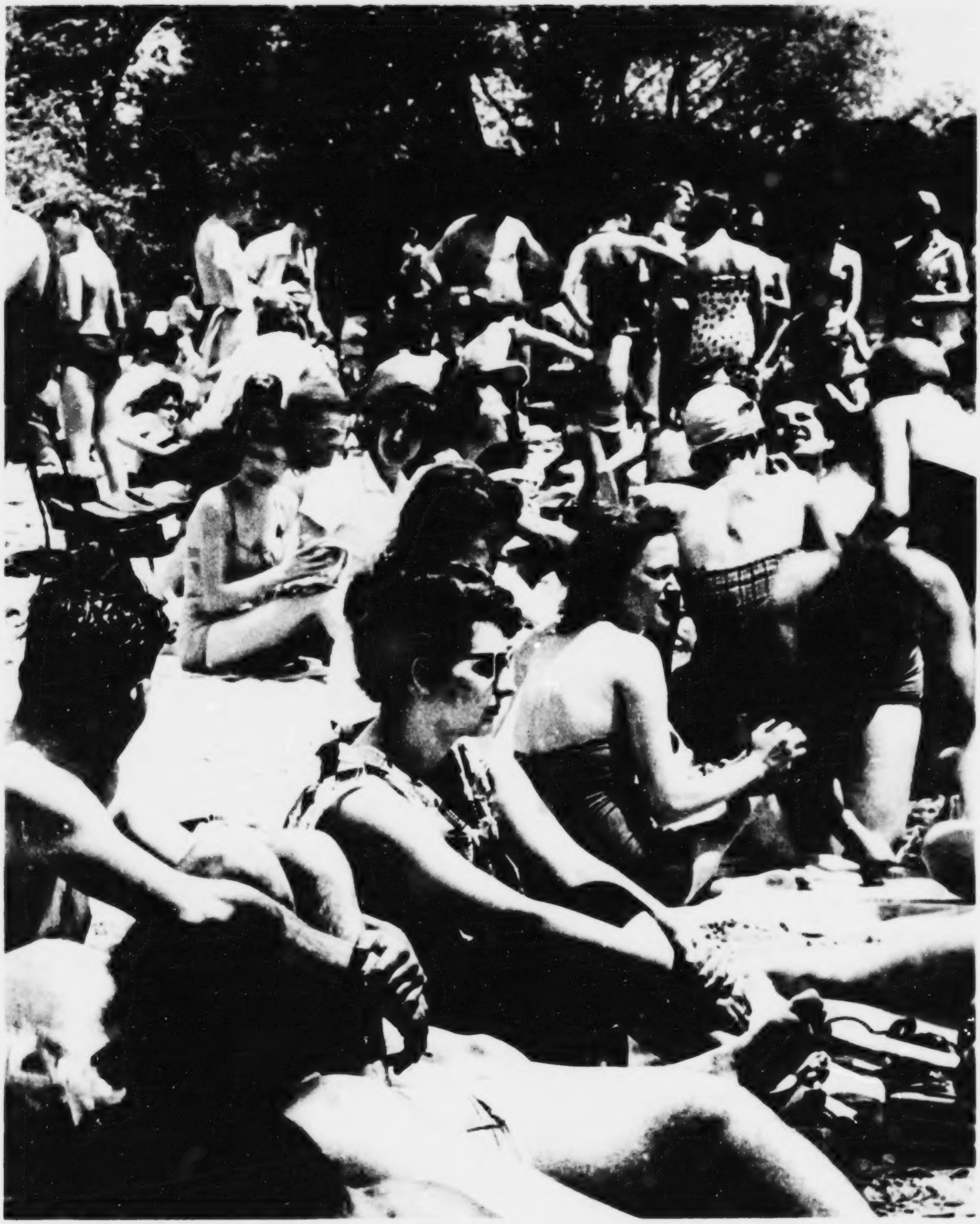


Figure No. 23 Many recreation facilities on the southern end of the Lake Michigan Basin are presently over crowded as this scene of the beach at Holland State Park in Michigan depicts. Unless action is taken now to relieve the situation much of the value of such recreational experiences as going to the beach will be lost. Photo courtesy Michigan Department of Conservation.

unusual recreational values of the kind usually characteristic of National and state parks.

Existing park acreage could be supplemented by further development of some present forest and game land where such additional use pressure would not interfere with the primary purpose for which the area was established. Such use generally involves agency administrative policy, capacity of potential area to stand intensive recreation use and many other factors which go into the determination of the suitability of an area for the proposed use. Such action is generally considered practical and Federal, state and county forest lands are presently being put to such use in varying degrees without changing the designation or primary designated use of them. In the State of Wisconsin, intensive development occurs on only 918 acres or 0.2 percent of the State's 383,329 acres of State forest lands, yet these areas provide substantial recreation opportunity. Many similar areas of intensive use have been developed on Federal and county forest areas. To a lesser degree, parts of wildlife areas are being developed for more intensive use especially through the establishment of better boat launching facilities.

There is a need to expand and renovate parks and forests that are being overused. In many state parks and forests in the Basin, it has been necessary to turn away campers because of over-crowded conditions. See Figure No. 24. Such conditions are not good for the parks nor the people. A dusty, crowded park or forest campground provides a low-quality recreational experience. See Figures 25 and 26. The need for recreation space, particularly in the metropolitan regions, is reflected in the tendency of the public to commit trespass in achieving access to lakes and streams. People generally hold to a belief of inherent right to enjoy the out-of-doors and if public access to a recreation resource is not available, then trespass on and across private lands becomes commonplace and difficult to control. Access has become a steadily increasing problem since the late forties as our expanding population has put more and more pressure on the land and water areas. Private owners meanwhile have increased their resistance to indiscriminate use of their land and water areas by others. See Figure No. 27. With greater public access available, there would be less excuse for trespass on private property.

An article written in the January 13, 1964 issue of U.S. News and World Report indicates there is an increase in the buying of second homes for weekends, vacations and possible later use for retirement. These second homes are generally within three hours driving time of the permanent residence. By 1970, the article says the rate of construction of vacation homes is expected to reach

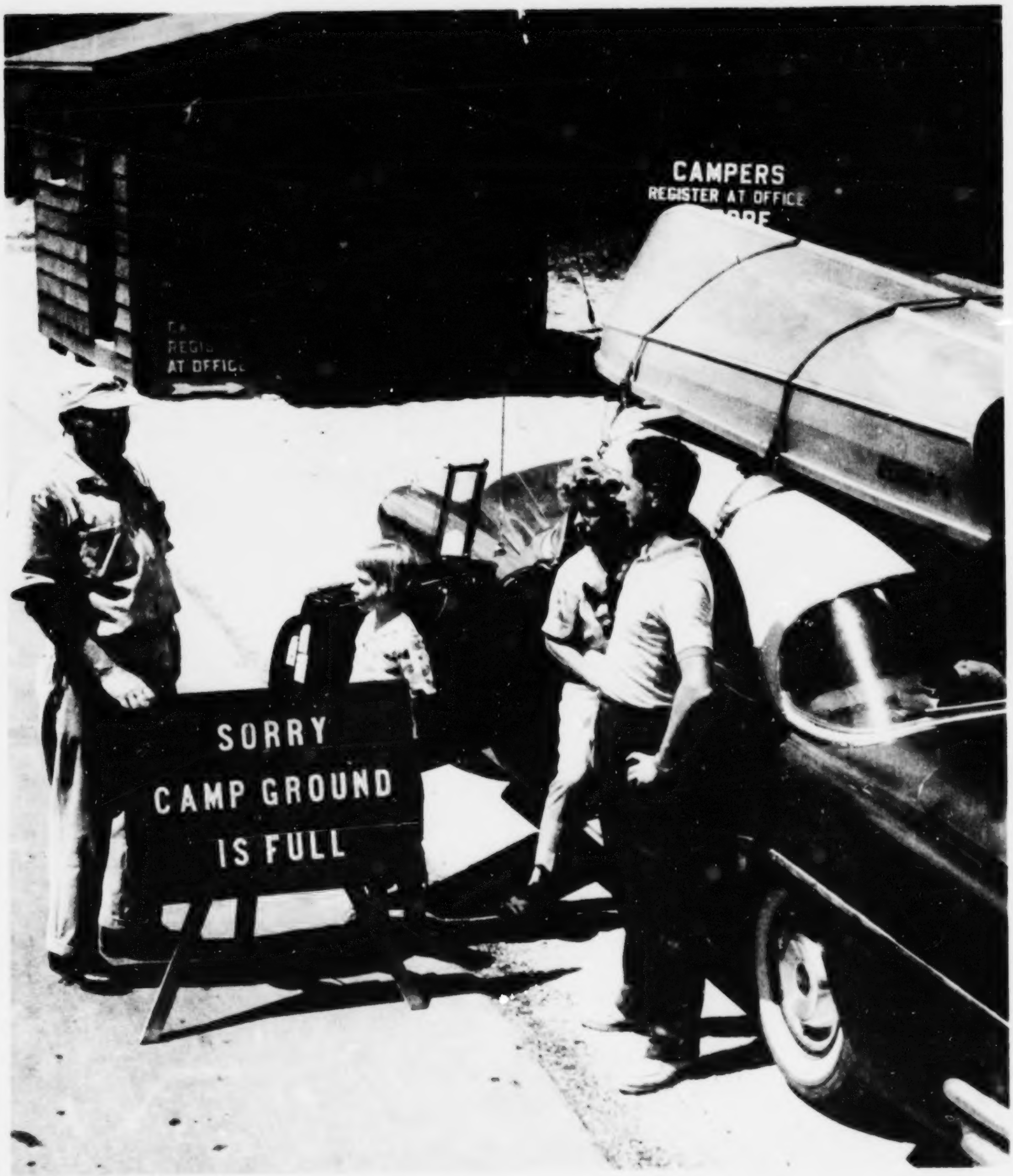

CAMPERS
REGISTER AT OFFICE
SORRY
CAMP GROUND
IS FULL
AT OFFICE

Figure No. 34 Full camp grounds an all too familiar scene in the Lake Michigan Basin. All agencies concerned with the administration of recreation lands are working hard to fill the ever increasing needs. Photo courtesy Michigan Department of Conservation.

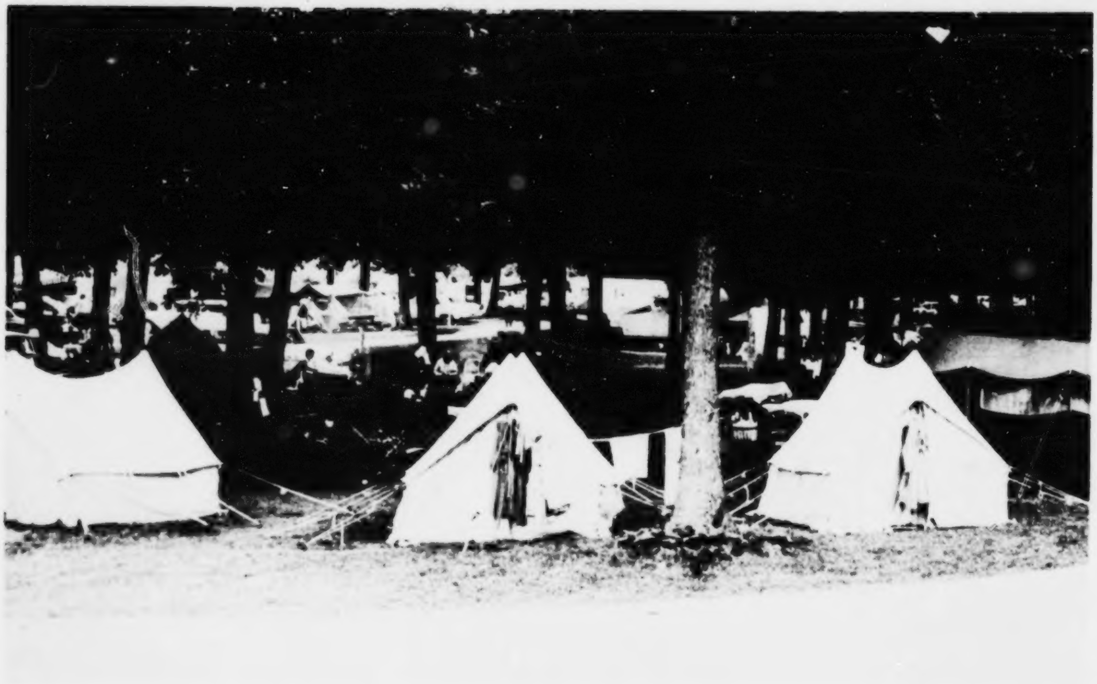


Figure No. 25 Over crowded camp grounds reduce the pleasure of camping and very often result in poor sanitary conditions throughout the camp ground. Photo courtesy Wisconsin Department of Conservation.

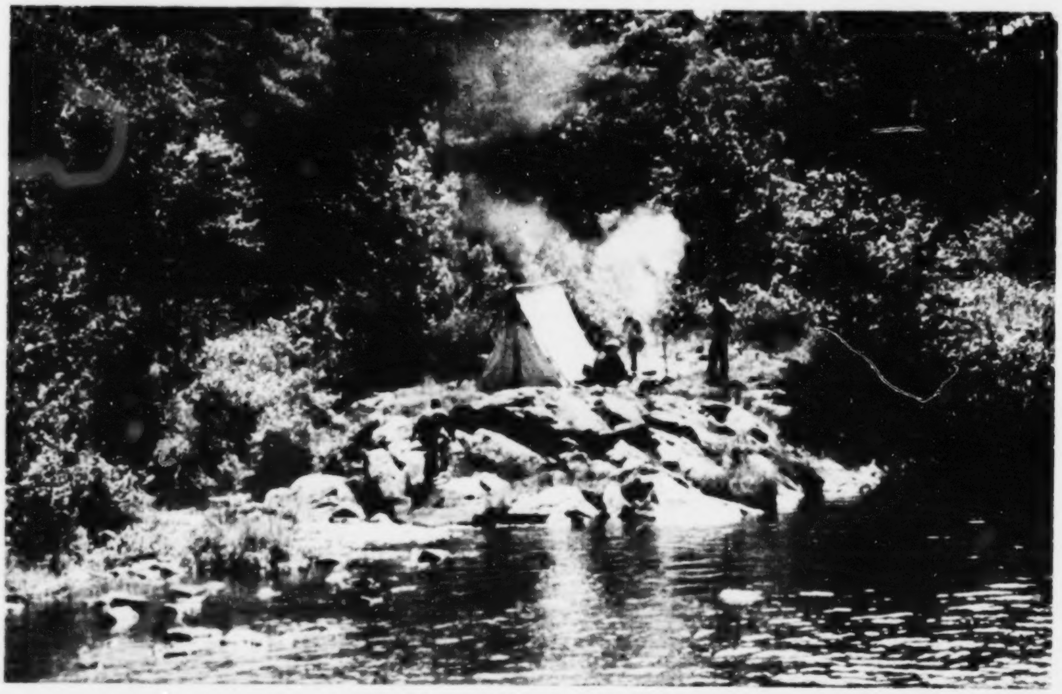


Figure No. 26 The value of the pristine beauty and solitude of this camp in contrast to that shown above must not be ignored in determining recreational values. Photo courtesy Wisconsin Department of Conservation.

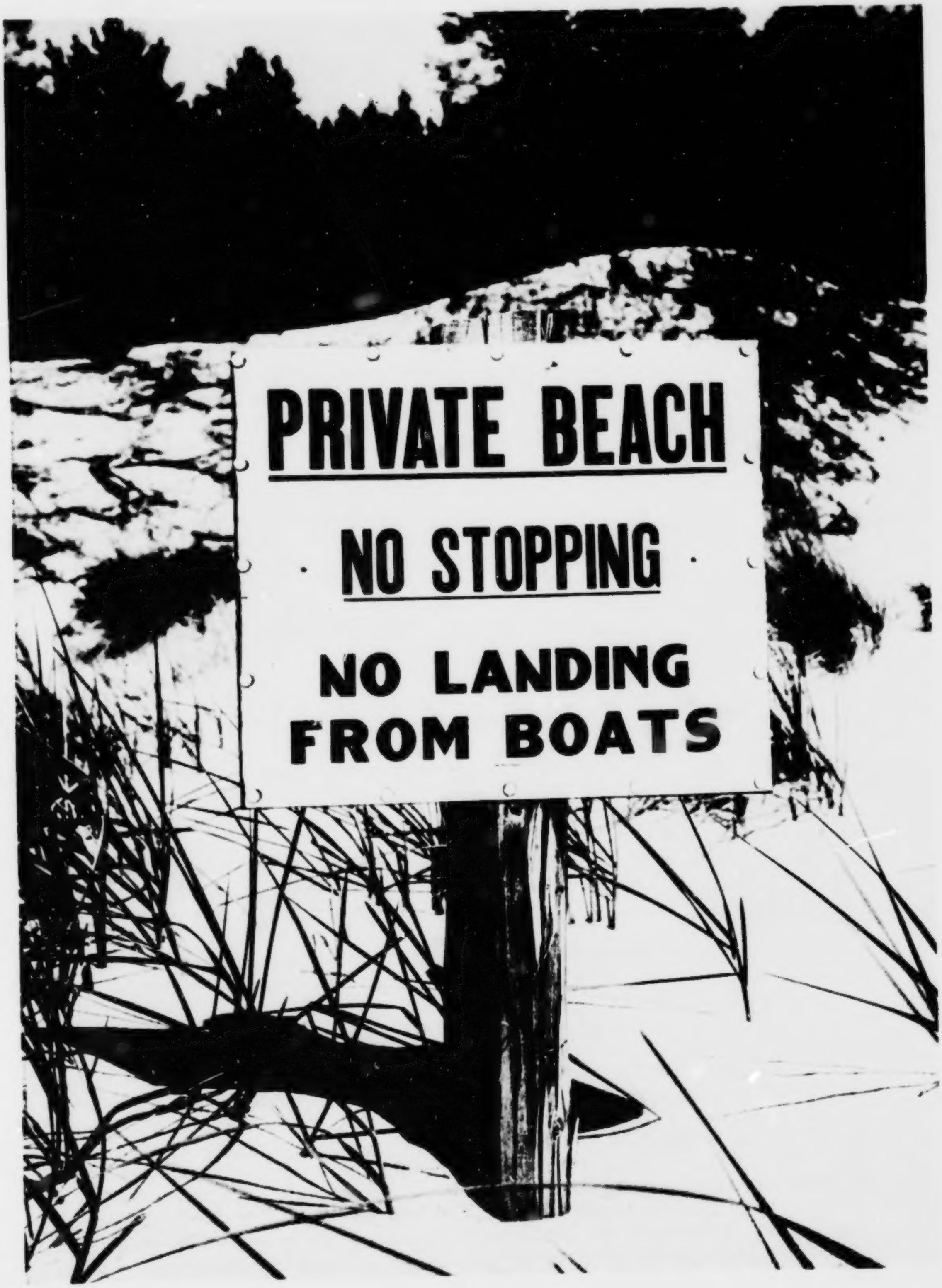

PRIVATE BEACH
NO STOPPING
NO LANDING FROM BOATS

Figure No. 27 Private land owners often resist use of their property by others. Photo courtesy Michigan Department of Conservation.

200,000 or more a year. Since most of the Basin is traditionally vacationland for a large segment of the midwestern population, much of the predicted annual vacation home construction may be expected within it. This points out the urgent need for proper zoning throughout the Basin. See Figure No. 28. It also indicates that there will be considerable competition for land desirable for recreational development.

The Wisconsin Department of Resource Development ironically reports that today there are two kinds of slum dwellers, those who own a cottage on a 40' by 80' lake lot and those commonly identified with the large city. The department has proposed a way to avoid "cottage clutter" in those areas around lakes and along rivers which have not as yet been developed. The plan calls for cottages to be built in clusters with a separation of natural vegetation between to maintain a feeling of remoteness. Each cluster could have a common road, boat dock, sewage treatment facility, water system and other services. Clusters could also be set back from the shore far enough to screen them from view from lake side. Such development would require strong zoning regulations with strict enforcement. The results of such a plan would be maintenance of natural features and scenic beauty around lakes, the possibility of public access to certain points on a lake where there might otherwise be none and a greater possibility of sanitation and pollution control.

"Cottage clutter" has ruined many good lakes such as Houghton in Michigan and Shawano and Loon in Wisconsin in the Lake Michigan watershed through degradation of the water quality and natural features of the lake they surround. It has caused difficulties in public access, and made them less recreationally enjoyable--not only for the public in general, but also for the cottage dwellers themselves.

A "cottage cluster" plan of development as proposed in Wisconsin, could reduce such problems on lakes yet to be developed.

Goals

To meet the recreational needs of the Basin, these goals must be achieved: 1) acquisition and development of adequate suitable public recreation facilities within reasonable distances of those who would use them, 2) reduction of present pollution and prevention of further pollution of recreational waters and 3) proper zoning and planned development of lands within and adjacent to recreational areas. Each agency concerned has its own proposal for accomplishing the goals. The State of Wisconsin has a ten year, $50 million program supported by a cigarette tax to finance acquisition and

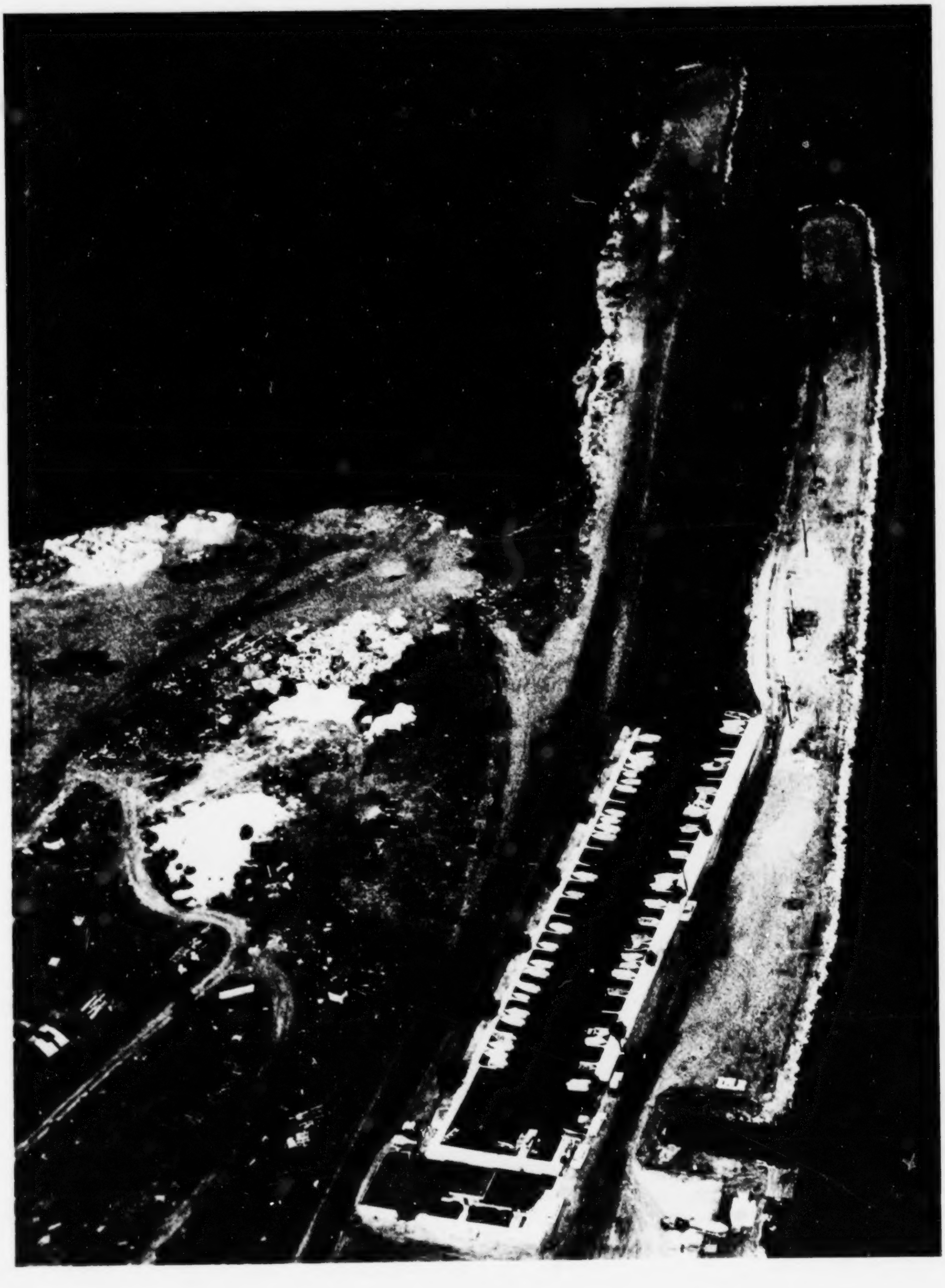


Figure No. 28 In many areas within the basin lack of proper zoning results in situations such as is illustrated above. Junk yards detract aesthetically from the recreation experience. Photo courtesy Michigan Department of Conservation.

development of recreational lands. Indiana also benefits from a state cigarette tax. Michigan has a bonding program financed by park entrance and camping fees to acquire and develop additional park lands. The Federal Government has several programs and agencies concerned with acquisition and development of recreational lands. These were more fully discussed in the chapter on proposed and potential recreation areas. All levels of government have agencies with programs directed toward the improvement of water quality for recreation and other purposes.

Zoning has, in the past, been a local governmental responsibility but, due to its inadequacy or failure to cope with zoning problems in many areas, the Federal and state governments are showing increased interest in alternative control systems. Chapter 3, Section 319 of the Federal Highway Act of 1958 (P.L. 85-767) which provides for acquisition of land to preserve scenic views and incentive payments to states for the protection of roadside beauty, is an example of such action. The State of Wisconsin has made provision for the purchase of "scenic easements" to help preserve the natural look along its highways.

Long term needs of the Basin are illustrated on Table No. 21. These long range needs have been estimated using ORRRC studies of future recreational demands on a national scale. Several organizations have made studies and in some cases prepared plans for acquisition and development of recreational lands through the 1970's; however, few have gone beyond this to any degree. Such efforts are a start and point the way toward the goals which must be achieved if needs to the year 2010 are to be met. Much study and planning remains to be done. It can be accomplished through presently constituted agencies and programs such as those outlined previously.

Capability of Existing and Proposed Facilities to Satisfy Projected Demand.

A comparison of existing and proposed facilities with projected demand would seem to indicate a tremendous deficit. As indicated on Table No. 21, most of the deficit will occur in Zones 1 and 4. In Zone 1, for example, the proposed addition of 11,000 acres to the existing 26,500 acres of park and other recreation lands does not begin to approach the indicated need of 224,500 acres. As stated previously, acres alone do not tell the full story; the quality of the land and level of development are equally important. Each acre of available land must be put to its best outdoor recreational use. Multiple use of other areas in public ownership will be necessary, private recreational development open to the public must be encouraged and a revision of standards and acquisition goals may be necessary.

Table No. 21

RECREATION LAND NEEDS

BY THE YEAR 2010

Zone	Resident Population: 2010 1/	Existing User Oriented (acres)	Projected User Oriented Needs (acres)	Existing Intermediate (acres)	Projected Intermediate Needs (acres)
1	4,988,000	29,660	99,760	26,449	224,500
2	205,000	4,690	4,100	3,170	9,200
3	746,000	3,070	14,920	19,580	33,600
4	6,263,000	5,570	125,260	10,180	281,800
Basin	12,202,000	42,990	244,040	59,379	549,100

1/ U. S. Public Health Service

In Zone 1, there is also the possibility of National and county forest absorbing some of the projected demand. However, under present transportation methods, most of these lands are outside the area of greatest need.

The passage of the Land and Water Conservation Fund Act will no doubt cause a revision of Federal, state and local government acquisition and development plans. To what extent such programs will be accelerated and expanded because of this Act is not as yet known, but the impact will be considerable and favorable.

Title VII of the Housing Act of 1961 established a program of Federal assistance for the acquisition of open space in urban areas which has helped several urban communities within the Basin such as Hammond, Indiana and Chicago, Illinois in the planning and acquisition of recreation areas. The importance of these areas lies in their nearness to the population they serve. The continuation of this program will also help, but it appears that the existing and proposed recreation facilities in the Basin cannot hope to meet future needs; however, the potential is there. The basic resources of land areas and inland lakes, although somewhat tainted by pollution, are available. Financial assistance is available for the planning, acquisition and development of these resources for recreational purposes.

The recreational needs can be met only through public support of the programs aimed at fulfilling them. Such programs include not only the more obvious such as acquisition and development of recreation areas, but also programs for developing better roads and other transportation systems, improvement of fish and wildlife habitat and aiding private recreational enterprise. Citizen support of health and sanitation agency programs developed to advance efforts to provide clean water for recreational purposes is another vital adjunct to meeting present and future outdoor recreation needs.

WATER QUALITY INFLUENCES

Water quality is a most important factor influencing the recreational uses which are made of the water, as it affects the quality of the outdoor recreation experience. Water-oriented recreational activities may be divided into two categories--one of which involves actual contact with the water. This category is further broken down by the Public Health Service into activities involving whole body contact such as swimming and water skiing and those involving limited contact such as pleasure boating and fishing. The other category involves the aesthetic enjoyment of viewing the body of water and its surroundings. This includes such activities as driving and hiking for pleasure along the shore of the body of water. An important part of the recreational value of water is its aesthetic aspect. Camping, picnicking, sightseeing, while not directly water-oriented activities, are considerably enhanced as an experience by aesthetically pleasing water. See Figure No. 29. Pollution robs the water of its aesthetic value for such activities.

According to Report No. 24 of the Select Committee on National Water Resources of the U. S. Senate, recreational uses of water require high quality water, paralleling that for public water supplies. Of course, the limitations placed on recreation by water quality will vary depending on the type of water-oriented recreation engaged in. According to ORRRC Report No. 10, water to be acceptable for swimming should be reasonably free of toxic chemicals, disease-causing bacteria, objectionable visible matter and obnoxious tastes and odors. On the other hand, if the water is to be used solely for boating, it need only be free from objectionable odors, floating or submerged solids and chemicals which would cause damage to the craft. The Technical Committee of the Great Lakes-Illinois River Basins Project suggests that the coliform content of water used for bathing should not exceed 1,000 per 100 milliliters while that used for boating should not exceed 5,000 per 100 milliliters.

The most notable causes of pollution affecting recreational waters are effluents from municipal sewage systems and industrial plants. However, suspended silt from erosion and even pollution caused by recreationists themselves have on occasion rendered water and/or its adjacent land areas unsuited for recreation. As an example, waste discharges from pleasure boats, unsewered cottages and other inhabited structures have resulted in unsuitable conditions at beaches and shorelines in general. In addition, broken glass from beer and pop bottles and tin cans discarded by recreationists have rendered even areas of high quality water unsuitable for certain recreational uses. See Figure No. 30.

Figure No. 29 Enjoying the aesthetic value of water is an important form of recreation for many. Photo courtesy Wisconsin Department of Conservation.

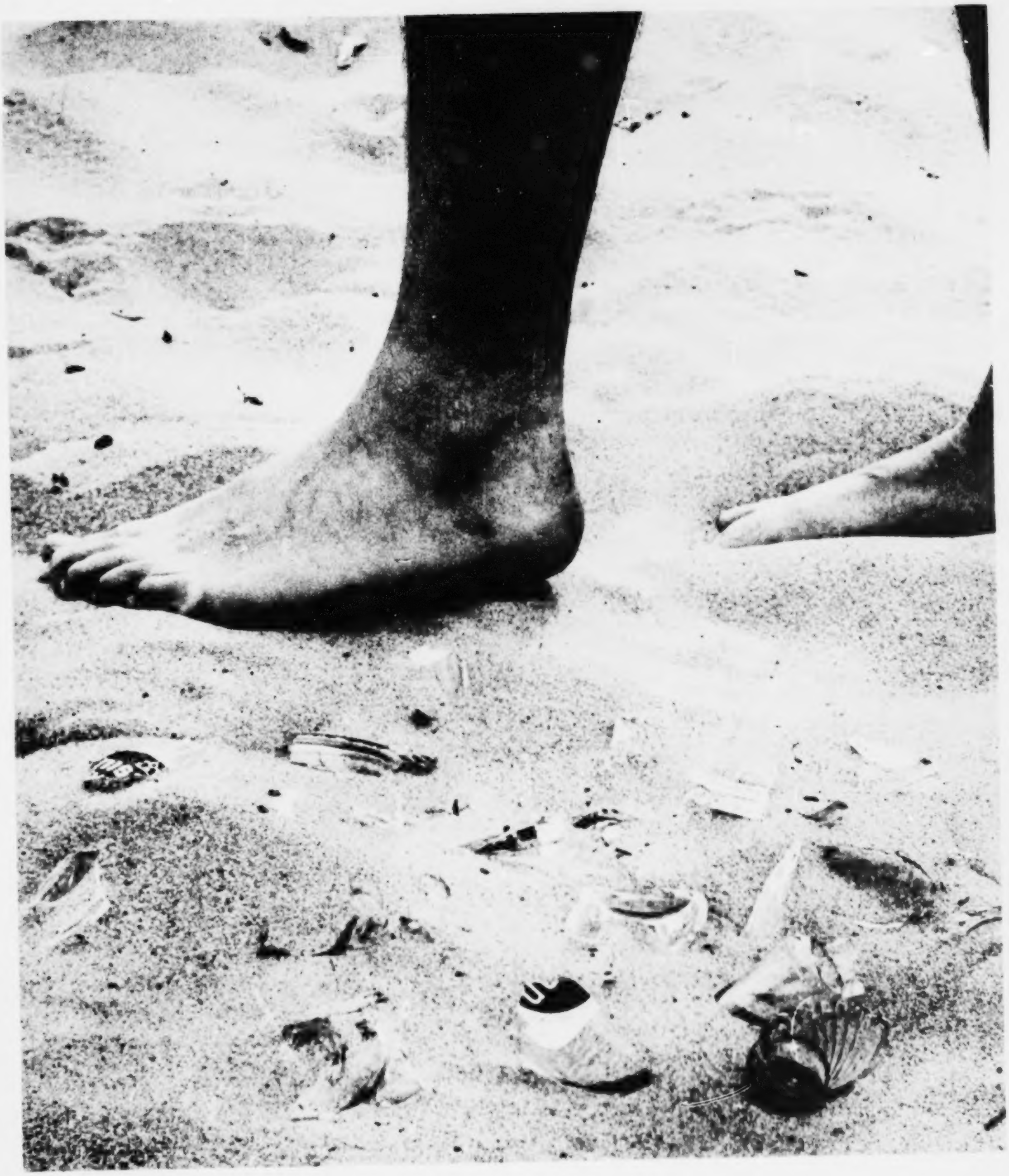


Figure No. 30 Pollution of recreation areas by the recreationists themselves poses a major problem. Photo courtesy Michigan Department of Conservation.

The State of Wisconsin has an excellent law governing the use of marine toilets on inland waters of the state. Unfortunately, it is not applicable to Lakes Michigan or Winnebago. Indiana has a similar law; however, boats operating exclusively on Lake Michigan are excepted. Section 13 of the River and Harbor Act of 1899 makes it unlawful to discharge refuse from craft; however, waste discharged in a liquid form is apparently excepted. Such laws as indicated are in need of strengthening.

Water enrichment from farm fertilizers also has its effect on the recreational quality of the water, causing excessive plant growth.

Physical Characteristics

A physical characteristic not related to pollution which causes most of the shore of Lake Michigan to be unacceptable to many people during the summer is low water temperature.

A survey conducted by the Milwaukee County Parks Department indicated only about five percent of the people using the beaches along the Lake actually went swimming. Lower water temperatures seldom limit other types of water-oriented recreation; however, the lack of bays, inlets, suitable harbors of refuge and turbulence of the water due to wind and wave action make Lake Michigan unsuitable for use by many weekend small-boat sailors.

Recreation Habits

Recreation habits change. Though a particular type of recreational activity in an area may have been very popular in the past, its decline in popularity may or may not be related to water quality. In years past, excursion boating on lakes such as Leelanau and even Lake Michigan itself was very popular. Its decline in popularity was due to technological advances and economic factors rather than as a result of changes in water quality. On the other hand, historical records indicate swimming clubs were popular along the Milwaukee River at one time. In this instance, deterioration of water quality was a major factor in the cessation of swimming activities in the Milwaukee River.

Pollution Problem

The severity of the pollution problem varies from place to place on a given body of water and in many instances from time to time depending on weather and other factors. In addition people vary widely in their opinions as to the point at which water quality has deteriorated to the extent that it is no longer suited for certain recreation activities. For example, the Milwaukee County Park Department closed certain beaches in past years; however, swimming at them continued. In addition, thousands used the beaches for sun bathing and relaxing as they had prior to the closings.

The types of recreational activity engaged in at an area change as water quality changes. Historical records indicate that certain streams in Michigan and Wisconsin presently barren of trout were excellent trout streams prior to the time the virgin forests on their watersheds were logged off. As a result of logging and alteration of the streams for drives, they became wider, shallower, warmer and often laden with silt. Though no longer suited to trout fishing, many are still excellent canoe routes, provide other types of fishing and have considerable aesthetic value. Too, the construction of a dam on a stream may slow the water, causing it to become warmer and changing the area from one of trout fishing and white-water canoeing to one of pan fishing, boating and water skiing. While some recreational values have definitely been lost due to such alteration of the stream characteristics and subsequent changes in water quality, other recreational values have been gained.

Summary

Such factors as those illustrated make difficult the measurement of the actual number of recreation activity days lost or gained due to changes in water quality. However, the fact that losses do occur is evidenced by such statements as the following, quoted from a report by the Wisconsin Department of Resource Development. "Recreational use of inner Green Bay has been limited considerably due to pollution for many years. Swimming at Bay Beach Park on the east Bay shore was prohibited by the Green Bay Health Department approximately 25 years ago. (See Figures No. 31 and 32.) All types of fishing . . . in the Green Bay City vicinity are now virtually non-existent." The loss of swimming opportunities due to low water quality in an impoundment on the Kalamazoo River within the Allegan State Forest of Michigan is another case in point.

Historical information collected by Mr. Spenser W. Havlick during a study of the Milwaukee River indicates that there were many recreational enterprises serving the needs of the Milwaukee citizenry along the river between Silver Spring Drive and North Avenue from 1890 to 1930. Such facilities included five canoe liveries with as many as 480 canoes for rent, four swimming and three rowing clubs. It was not uncommon for 8,000-9,000 people to make use of this stretch of river on a summer weekend. On July 4, 1922, an estimated 28,000 people were present during a regatta on the river. Today, this portion of the river is not used by the public to any extent

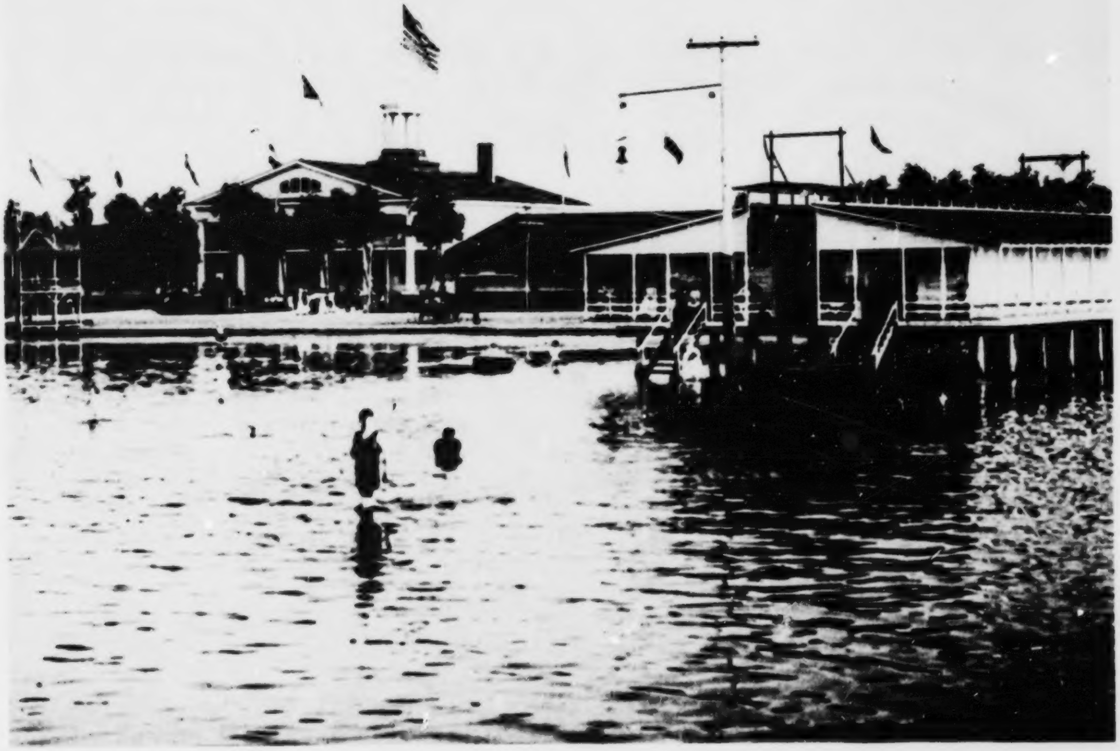


Figure No. 31 Swimming facilities at Bay View Beach on the Green Bay circa 1910. Photo courtesy State Historical Society of Wisconsin.

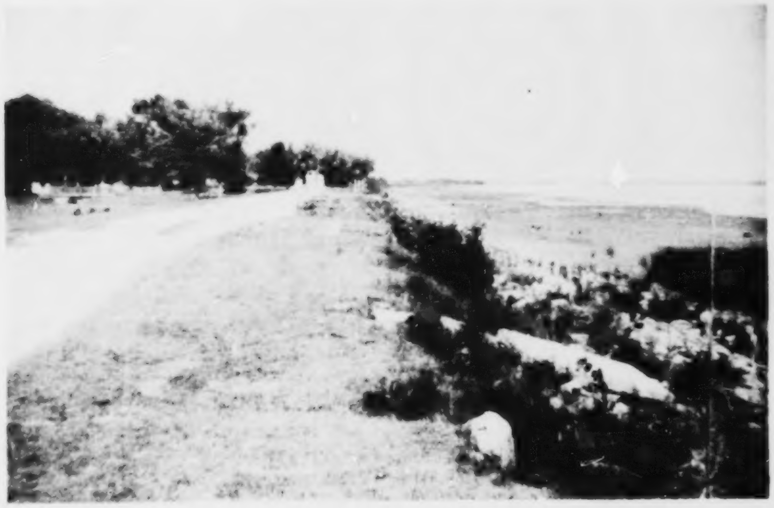


Figure No. 32 Current view of area shown above. Swimming has not been permitted here for many years due to water pollution. Photo by Bureau of Outdoor Recreation.

though it runs through the heart of the metropolitan area. The recreational activity days lost are estimated as follows: peak day attendance-4,500 (half weekend attendance) is multiplied by 47 peak days of activity to obtain activity days of recreation lost annually in this area. The calculations indicate an annual loss of 211,500 activity days. This calculation is based on past use. If it were possible to base it on present or future use, the resultant activity days of recreation lost would in all probability be much greater. To say that this loss in recreation activity is due to pollution would not be entirely correct as indications are that the river was polluted during the time this recreation activity was taking place on it. However, as our scientific knowledge advanced, we became aware of the perils of using such water for swimming and related activities. As a result, we are less inclined to use them than formerly. Where health may be affected, officials have, in many areas, acted to restrict such use. In addition, recreational habits have changed over the years.

A public hearing was held in November 1963 at Elkhart, Indiana by the Corps of Engineers concerning the St. Joseph River. The predominant request voiced was that something be done about the pollution in the river to make it more suitable for recreation. For example, a statement by the Board of Parks and Recreation of Elkhart indicated they were interested in, "A study of improvements . . . to include the problems of pollution which would affect swimming in rivers and lakes in the area." According to Mayor L. H. Russell of Elkhart, Indiana, "At intervals during the past few years, the streams that flow into and through Elkhart have become contaminated enough to kill hundreds of fish and to force closing of our public swimming facilities."

A recent microbiological investigation conducted by the U. S. Public Health Service of certain marinas along Lake Michigan indicated all were subject to fecal contamination. These marinas are located in Milwaukee, Wisconsin; Waukegan, Illinois; Jackson Park, Chicago, Illinois; Buffington, Indiana; and Snug Harbor, Michigan, Whether the source of pollution was from the boats within the harbor or from other sources was not indicated.

According to a report prepared by the Wisconsin Department of Resource Development in 1964 on the problem of pollution along the Wisconsin shore of Lake Michigan, a number of lake side communities have complained of pollution from pleasure craft. The increasing number of these boats creates a continual and growing source of pollution. Large numbers of pleasure craft in urban areas have resulted in greater congestion and, in turn, greater pollution of harbors and marinas. Oil and gasoline wastes, as well as garbage and sewage from onboard cooking and toilet facilities, are the major sources of this pollution. The swimming beach at Peninsula State Park in Wisconsin has been closed repeatedly as a result of pollution from pleasure boats. Wisconsin statutes prohibit the discharge of sewage from boats on inland waters of the State, but they do not include the waters of Lake Michigan. The National Association of State Boating Law Administrators conducted a study to determine the extent of pollution contributed by pleasure craft. The committee appointed by the association concluded that the pollution of waters attributable to recreational watercraft is of a most insignificant nature. The committee further concluded that the deposition of "litter" consisting of trash, garbage and other materials was a greater problem than that caused by pollution from recreational craft toilets. Though it may be concluded that the amount of contaminant contributed by pleasure boats is not significant, even in such situations it must be recognized that every source of pollution must be eliminated if recreational waters are to be safe for all water-oriented outdoor recreational activities.

Several communities along the Lake Michigan shore at such widely scattered locations as Chicago, Illinois; Michigan City, Indiana; Harbor Springs, Michigan; and Milwaukee, Wisconsin have experienced pollution of their beaches from dead fish and algae.

The alewife, which invaded the Great Lakes in the late 1940's from the ocean, has increased in numbers to such an extent that it is now the most numerous species of fish in the Great Lakes. These fish die in large numbers annually. It is thought these die-offs are related to the age of the fish and its physiological make-up. The die-off is also thought to be related to sudden changes in water temperature sometimes encountered by the fish.

The seriousness of this condition is illustrated by the situation at Michigan City, Indiana, where, due to dead fish on their beaches in July, a drop in beach attendance causes an estimated loss of 9,000 activity days of swimming annually. Similar conditions exist at most of the beach facilities in the southern area. The City of Chicago estimated 540 cubic yards of dead fish were removed from their beaches during the 1964 swimming season. According to studies made by the Bureau of Commercial Fisheries, the problems created by the alewife are destined to become more serious before subsiding.

As summer progresses, the growth of algae on offshore reefs presents a serious problem particularly in the Green Bay area and around the southern end of Lake Michigan. The filamentous algae grows to lengths of three to six feet on these reefs, then breaks off close to the base and floats to shore. Although the algae may not present a health problem, the thick mats are a hazard to swimming children, its odors are obnoxious, and it is aesthetically displeasing.

Recreational use of lakes and streams and their shores is the main source of damage to water quality in remote areas. To be near water, more and more people are building cabins on recreational sites along streams and lakeshores where sewage systems do not exist. Septic tank effluents and other wastes drain into the streams and lakes which are the main recreational attraction of the area. As effluent flows into the rivers and seeps into lakes surrounded by habitation, offensive odors, excessive weeds and hygienically unsafe waters will decrease the available water as a suitable resource and restrict those recreation opportunities available.

In addition to pollution problems which affect the recreational use of certain waters, naturally occurring organisms have their effect on recreation. A particularly acute problem is schistosome cercanial dermatitis, commonly called swimmers' itch. According to a report by Carlos M. Fetterolf, Jr. of the Michigan Water Resources Commission, as far back as the lumbering days, bathers have been aware of the itching rashes which developed after swimming in certain areas. Although swimmers' itch has been reported in only a few lakes in the Michigan and Wisconsin portion of the Basin, it is the large, recreationally important ones which seem most often affected. Brevoort, Cadillac, Mitchell, Glen, Houghton, Black and LeLanau Lakes in Michigan; Shawano, Wilson, Pine, Noquebay, Keating, Metonga and Random in Wisconsin; are major lakes within the Basin which have been affected.

Control of swimmers' itch is possible through the use of copper sulfate. The copper sulfate is applied to swimming areas to kill snails which act as intermediate hosts of the organisms causing the itch. State agencies in both Wisconsin and Michigan have programs of assistance to individuals or groups wishing to undertake control measures.

Many of the streams and rivers, particularly in northern Wisconsin and the Upper Peninsula of Michigan, have their sources in National or state forests or flow through sparsely populated areas, and therefore are generally not exposed to severe pollution damage by developments in their upper reaches. The Wolf River and its major tributaries, the Fox River above Lake Winnebago in Wisconsin and the Whitefish, Ford and Manistique Rivers in the Upper Peninsula of Michigan are good examples of such rivers. These rivers are usually too cold for body contact recreational activities, but their value as trout streams and canoe routes is high. In the Lower

Peninsula of Michigan, the Little Manistee, Big Sable and Pere Marquette Rivers are considered to have little or no pollution which would adversely affect recreation. Though the water quality of the above streams is presently considered good, as their watersheds are further developed to meet the growing recreational and other needs of people, the tendency will be toward lowering of the quality.

Continued degradation of water resources in the urbanized areas of the Basin will place greater recreational use pressure on the fewer remaining acceptable water areas. It will require people to travel even greater distances in quest of suitable water-oriented recreation activities. Bacterial contamination of the recreation lakes and streams by unsewered cottages will become an increasing problem as more cottages are built and they receive more use due to longer vacations and easier travel conditions. These trends must be reversed if suitable water-oriented recreation areas are to be found in the future. Plate No. 25 shows general areas where poor water quality has affected recreation.

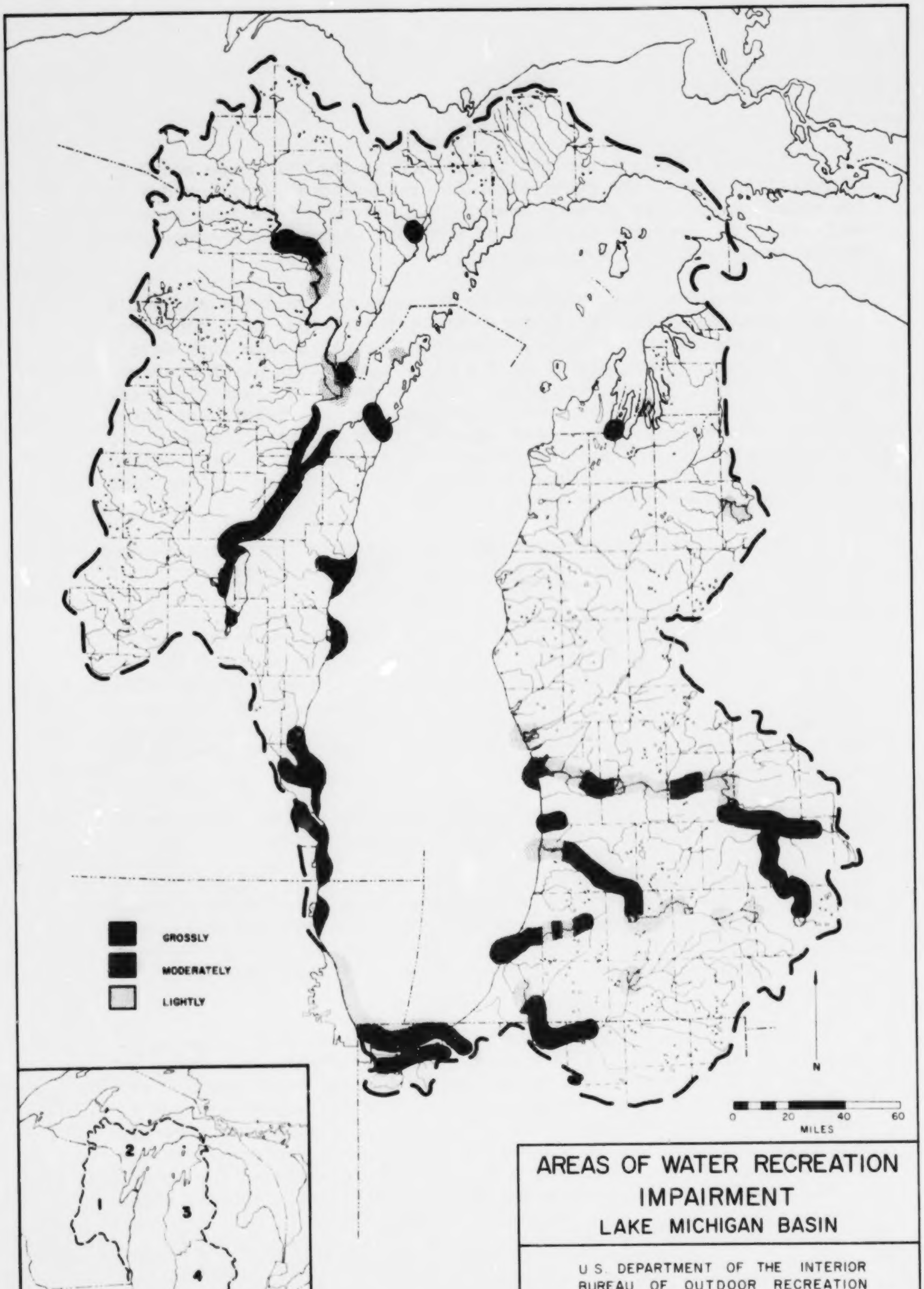
Such effect has been divided into the three categories of light, moderate and gross impairment as follows:

Waters lightly impaired were considered to be those on and in which recreational activities involving body contact with the water could be freely engaged in. Such waters, however, are not aesthetically pleasing at least part of the recreational season due to man's activities in the area. These activities would include mining, gravel washing, canning, sewage treatment and similar activities.

Waters moderately impaired were considered to be those on which recreational activities not involving body contact with the water could be freely engaged in. Some persons may engage in the water activities involving body contact, but many would shy away from such activity.

Waters grossly impaired were considered to be those on and in which most people would not engage in activities requiring body contact with the water and many would not engage in activities on the water. Much of the time such waters would be aesthetically displeasing due to algae growth, dead fish, oil slicks, floating debris and the like.

Among the factors taken into consideration were the past records and reports of the Wisconsin Department of Resource Development and the Michigan Water Resources Commission. Where possible, records of coliform counts were used.


GROSSLY
MODERATELY
LIGHTLY
N
0
20
40
60
MILES
1
2
3
4
ZONES
DRD

AREAS OF WATER RECREATION IMPAIRMENT
LAKE MICHIGAN BASIN

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF OUTDOOR RECREATION
Lake Central Region Ann Arbor, Mich
BOR July, 1964

Plate 25

In some highly urbanized areas such as the Milwaukee and Gary metropolitan areas, the restriction on recreational activity due to low water quality has already been felt. Attempts have been made in such areas to overcome the lack of suitable natural swimming areas by the construction of swimming pools.

In some instances public lake frontage is available and could be developed for swimming probably at less cost than pool construction of like capacity; however, water quality would make such development unwise. An example of such a situation occurs at Shoop Park, north of Racine, Wisconsin. Others may be found on Lake Winnebago and the southern edge of Lake Michigan in the vicinity of Gary, Indiana. Therefore, while there appears to be an overall supply of resources adequate to meet the present and immediate future demand for swimming and sun-bathing purposes, in localized situations resource shortages already exist.

This situation applies as well to certain other water-oriented recreation activities such as cold water fishing and some types of boating. Water skiing requires a considerable amount of area to attain speeds necessary for hydraulic lift and maneuvering. Portions of many of the rivers of the Basin are suitable for water skiing. On some, particularly those in highly urbanized areas, such use is not made to any extent because they are undesirable due to low water quality. Burns Ditch, the Milwaukee and St. Joseph Rivers are examples of such areas. Thus water skiing is restricted on a localized basis in portions of the Basin due to deterioration of the quality of the resource.

Winter sports are not generally thought of as affected by water quality. They are growing rapidly in popularity.

The Basin is currently estimated to receive 517,000 visits annually for winter sports activities other than ice fishing. Thus, with the large concentrations of people in the headwater areas, and the likelihood this activity will increase four times by the year 2010, the effect on water quality of these activities should not be discounted.

From the preceding discussion it can be seen that water quality per se has a demonstrable effect on recreational use. Many of the factors which contribute to the degradation of water quality can be measured readily: for example, rise in water temperature due to thermal pollution and amount of silt added to a stream as a result of agricultural activities. However, sociological factors which are very difficult to measure, play a key role in determining the extent to which quality will influence recreational use. These latter factors become very personal and differ with the individual depending upon his education and environmental background. Thus much additional study is needed in the field of water quality influences on recreation.

NEEDS, GOALS AND PROGRAMS FOR CONTINUING SURVEYS AND STUDIES

This study brought to light several areas in which there was insufficient information on which to base sound conclusions. It left unanswered the basic question of extent to which water pollution has diminished water-oriented recreation activities in terms of man days lost. Further study of this problem is necessary to find an answer to the question.

Refinement of water quality standards for the various water-oriented recreation activities and their adoption by all agencies concerned is also necessary before a complete solution can be found to the question above.

The influence water quality has in limiting or preventing one type of water-oriented recreation as compared to another is an additional area requiring study. This involves the psychological aspects of the effect water quality has on the participation in certain activities. For instance, why will some people swim in water which is obviously polluted and why is water skiing allowed by public officials in waters which are polluted to the extent that swimming is not permitted in them?

There is presently no plan coordinating all recreational development programs with the several states in the Basin. Though in some instances state plans have been prepared, they do not include the plans of lesser units of government under them. Through the development of statewide plans as required by the Land and Water Conservation Fund Act and through the nationwide planning effort presently underway by the Bureau of Outdoor Recreation, such overall recreation coordination will become a reality in the future.

Though state tourist councils have made estimates as to the number of tourists visiting the state, such estimates are very general in nature and not specific enough to be meaningful in recreation studies such as this. The State of Indiana is working on improvement of these estimates. A thorough study of non-resident visitation by activity and location, particularly in the field of private outdoor recreation, would answer many of the questions left unanswered in this study. A need has also been felt, as a result of this study, for information on which to base a determination of the value of one type of water-oriented outdoor recreation activity as compared to another. See Figure No. 33.

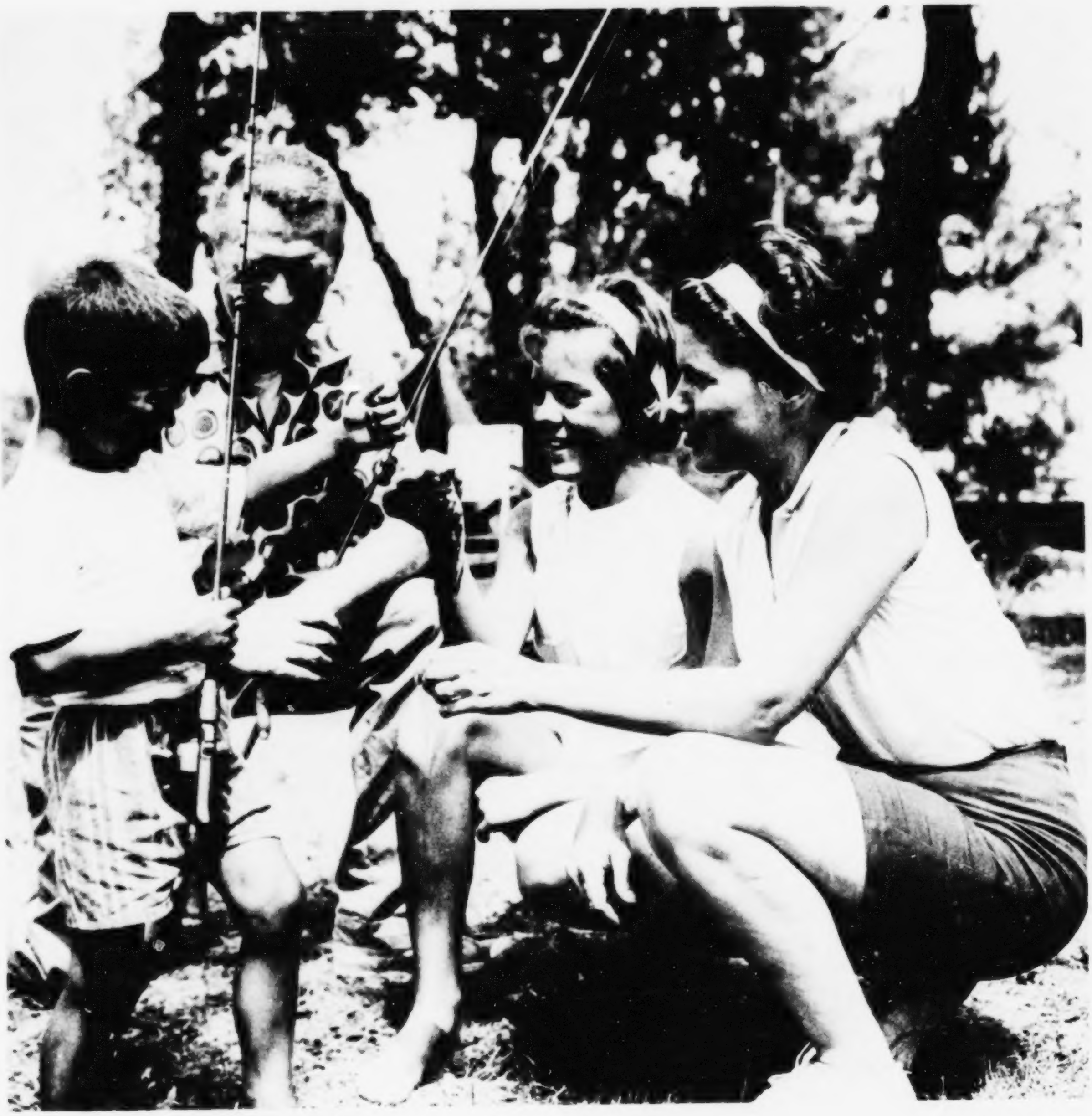


Figure No. 33 What is the value of this recreation experience to this boy and his family as compared to that of a trout fisherman catching a trout? Photo courtesy Wisconsin Department of Conservation.

ACKNOWLEDGMENTS

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The assistance of these agencies and all individuals named and unnamed who gave of their time and knowledge is gratefully acknowledged.

GREAT LAKES-ILLINOIS RIVER BASIN PROJECTS
RECREATION INVENTORY
LAKE MICHIGAN BASIN

NATIONAL

SITE NO.	NAME	COUNTY	LOCATION	AREA (acres)	WATER ORIENTED	SWIMMING	BOATING	FISHING	PICNICKING	TENT CAMPING	TRAILER CAMPING	GROUP CAMPING	REMARKS
	ZONE 1												
N-1	Bagley Rapids	Oconto	3 mi. S of Mountain		x	x		x	x	16			on Rat River
N-2	Bass Lake	Oconto	6 mi. SW of Lakewood		x	x	x	x	x	1			
N-3	Bear Lake	Forest	4 mi. E of Blackwell		x		x	x	x	2			
N-4	Boot Lake	Forest	7 mi. SW of Townsend		x	x	x	x	6	40			
N-5	Boulder Lake	Oconto	15 mi. W of Mountain		x	x	x	x	2	54			
N-6	Brule River	Forest	2 mi. E of Nelma		x			x	x	11			
N-7	Butternut Lake	Forest	12 mi. SW of Nelma		x			x	1				
N-8	Chipmunk Rapids	Florence	2 mi. E of Tipler		x		x	x	x	3			
N-9	Franklin Lake	Forest	16 mi. E of Eagle River		x	x	x	x	23	87			
N-10	Green Lake	Oconto	2 mi. S of Mountain		x			x	15				
N-11	Laura Gordon Lakes	Forest	4 mi. NE of Armstrong Creek		x	x	x	x	6	15			
N-12	Lost Lake	Florence	2 mi. E of Tipler		x	x	x	x	x	16			
N-13	Morgan Lake	Florence	9 mi. NE of Fence		x	x	x	x	5	10			
N-14	Pine Lake	Forest	1 mi. S of Hiles		x	x	x	x	2	9			
N-15	Pine River	Forest	20 mi. NW of Argonne		x		x	x	x	5			
N-16	Richardson Lake	Forest	4 mi. NW of Wabeno		x		x	x	3	13			
N-17	Spectacle Lake	Vilas	10 mi. W of Nelma		x	x	x	x	4	41			
N-18	Stevens Lake	Forest	1 mi. N of Tipler		x		x	x	x	7			
N-19	Wheeler Lake	Oconto	3 mi. NE of Lakewood		x	x	x	x		6			
N-20	Windson Dam	Forest	5 mi. SW of Alvin		x		x	x		4			
N-21	Burnt Bridge	Forest	9 mi. SE of Cavour										
N-22	Kentuck Lake	Vilas	8 mi. SW of Nelma		x	x	x	x	5	16			
N-23	Rat River	Forest	11 mi. NE of Wabeno				NO RECORD						new area recently established
N-24	Waupee Dam	Oconto	6 mi. NE of Mountain				NO RECORD						new area
N-25	Launa White Deer	Forest	10 mi. SW of Nelma				NO RECORD						new area
	ZONE 2												
N-26	Golden Lake	Iron	20 mi. NE of Iron River		x		x	x					Ottawa National Forest
N-27	Lake Ottawa	Iron	5 mi. SW of Iron River		x	x	x						Ottawa National Forest
N-28	Hagerman Lake	Iron	15 mi. SW of Iron River		x	x	x	x					Ottawa National Forest
N-29	Peninsula Point	Delta	20 mi. S of Rapid River		x		x		10				Hiawatha National Forest
N-30	Hovey Lake	Alger	10 mi. S of Munising		x		x	x		4			Hiawatha National Forest
N-31	Pole Creek Lake	Delta	25 mi. NE of Rapid River		x		x	x	8	21			Hiawatha National Forest
N-32	Island Lake	Alger	15 mi. S of Munising		x	x	x	x	8	5			Hiawatha National Forest
N-33	Widewaters	Alger	17 mi. S of Munising		x		x	x	4	16			Hiawatha National Forest
N-34	Flowing Well	Delta	[illegible] mi. N of Nahma Junction		x			x	16	10			Hiawatha National Forest
N-35	Haymeadow Creek	Delta	11 mi. NE of Rapid River		x			x		3			Hiawatha National Forest
N-36	Colwell Lake	Schoolcraft	10 mi. S of Shingleton		x	x	x	x	2	36			Hiawatha National Forest
N-37	Indian River	Schoolcraft	2 mi. E of Stauben		x			x	2	6			Hiawatha National Forest
N-38	Little Bass Lake	Schoolcraft	2 mi. SE of Stauben		x		x	x		5			Hiawatha National Forest
N-39	Petes Lake	Schoolcraft	16 mi. S of Munising		x	x	x	x	18	20			Hiawatha National Forest
N-40	Moccasin Lake	Schoolcraft	15 mi. S of Munising		x	x	x	x	1				Hiawatha National Forest
N-41	Corner Lake	Delta	20 mi. S of Munising		x		x	x	4	[illegible]			Hiawatha National Forest
N-42	Camp 7 Lake	Delta	14 mi. N of Isabella		x	x	x	x	16	14			Hiawatha National Forest

GREAT LAKES-ILLINOIS RIVER BASIN PROJECTS
RECREATION INVENTORY
LAKE MICHIGAN BASIN

NATIONAL													
SITE NO.	NAME	COUNTY	LOCATION	AREA (acres)	WATER ORIENTED	SWIMMING	BOATING	FISHING	PICNICKING	TENT CAMPING	TRAILER CAMPING	GROUP CAMPING	REMARKS
N-43	Lake Michigan	Mackinac	13 mi. NE of St. Ignace		x	x	x		18	18			Hiawatha National Forest
N-44	Brevoort Lake	Mackinac	15 mi. NW of St. Ignace		x	x	x	x		67			Hiawatha National Forest
	ZONE 3												
N-45	Bear Track	Lake	7 mi. W of Irons	10	x	x	x	x		16	x		on Little Manistee River
N-46	Dorner Lake	Manistee	1 mi. SE of Wellston	2	x		x	x	3	2			on Dorner Lake
N-47	Driftwood Valley	Lake	5 mi. SW of Irons	10	x	x	x	x		15			on Little Manistee River
N-48	Hemlock	Wexford	5 mi. W of Cadillac	4	x	x	x	x	4	15			on Lake Mitchell
N-49	Highbanks Lake	Newaygo	2 mi. W of Lilley	4	x	x	x	x	3	10			on Highbank Lake
N-50	Manikiwa	Manistee	1/2 mi. E of Brethern	2	x			x	6				on Lake Eleanor
N-51	Old Grade	Lake	2½ mi. NE of Peacock	16	x	x		x	2	17	x		on Little Manistee River
N-52	Peterson Bridge	Wexford	9 mi. E of Wellston	15	x	x		x	16	31			1 mi. S of Junction M-55-M-37
N-53	Pine Lake	Manistee	3 mi. SW of Wellston	3	x	x	x	x		10			on Pine River
N-54	Pines Point	Oceana	2 mi. SW of Hesperia	22	x		x	x	12	33	x		on White Lake
N-55	Ravine Camp	Wexford	6½ mi. N of White Cloud	2	x			x	5	3			on Grove Creek
N-56	River Drive	Mason	15 mi. SE of Manistee	1	x			x	4				on Little Manistee River
N-57	Sand Lake	Manistee	4 mi. SE of Wellston	3	x	x	x	x	12	34			on Sand Lake
N-58	Seaton Creek	Wexford	8 mi. NW of Harrietta	3	x		x	x	5	6			on Hodenpyle dam pond
N-59	Timber Creek	Lake	10½ mi. NW of Baldwin	5	x			x	2	5			on Timber Creek
N-60	Udell Rollways	Manistee	12 mi. E of Manistee	17	x		x	x	10	23			on Big Manistee River
N-61	Wayside	Newaygo	5 mi. W of White Cloud	2	x			x	7				on Alley Lake
N-62	Rainbow Rapids	Lake	9 mi. W of Baldwin	1	x		x		2				on Pere Marquette River
N-63	Nichols Lake	Newaygo	10 mi. S of Baldwin	18	x		x		16	28			on Nichols Lake

GREAT LAKES-ILLINOIS RIVER BASIN PROJECTS
RECREATION INVENTORY
LAKE MICHIGAN BASIN

STATE

SITE NO.	NAME	COUNTY	LOCATION	AREA (acres)	WATER ORIENTED	SWIMMING	BOATING	FISHING	PICNICKING	TENT CAMPING	TRAILER CAMPING	GROUP CAMPING	REMARKS
	ZONE 1												
S-1	Terry Andrae State Park	Sheboygan	South of Sheboygan	231	x	x		x	x	105	x		Lake Michigan, sand dunes
S-2	High Cliff State Park	Calumet	West of Hilbert	494	x	x	x	x	x	30	x		bluffs, Lake Winnebago
S-3	Peninsula State Park	Door	Green Bay at Fish Creek	3,687	x	x	x	x	x	340	x	x	bluffs, Green Bay
S-4	Potawatomi State Park	Door	West of Sturgeon Bay	1,046	x		x	x	x	118	x		limestone bluffs
S-5	Lost Daupnin Memorial	Brown	Southwest of DePere	19					x				home of Dauphin of France
S-6	Lizard Mound Memorial	Washington	Northeast of West Bend	20									Indian mounds
S-7	Old Wade House Memorial	Sheboygan	West of Plymouth	104					x				early American inn
S-8	Kettle Morain--North	Tri-county	North of Kewaskum	18,350	x	x	x	x	x	369	x	x	glacial formations
S-9	Point Beach	Manitowac	North of Two Rivers	2,498	x	x		x	x	114	x	x	sand beach
	ZONE 2												
S-10	Fayette State Park	Delta	8 mi. SW of Garden	171	x	x	x	x	x	40			ghost town
S-11	Van Riper State Park	Marquette	21 mi. W of Ishpeming	1,046	x	x	x	x	x	152			waterfalls
S-12	J. W. Wells State Park	Menominee	2 mi. S of Cedar River	974	x	x	x	x	x	150		64	dense forests, 2 mi. of beach
S-13	Indian Lake State Park	Schoolcraft	4 mi. W of Manistique	570	x	x	x	x	x	165			1 mile beach
S-14	Palms-Brook State Park	Schoolcraft	12 mi. NW of Manistique	308						0			bubbling pool
S-15	Ross Lake	Schoolcraft	10 mi. E of Melstrand	5	x	x	x	x		4			Grand Sable State Forest
S-16	Fox River	Schoolcraft	5 mi. NW of Seney	2	x			x		6			Grand Sable State Forest
S-17	Gemini Lake--North	Schoolcraft	8 mi. E of Melstrand	11	x	x		x		5			Grand Sable State Forest
S-18	Gemini Lake--South	Schoolcraft	7 mi. E of Melstrand	3	x	x		x		4			Grand Sable State Forest
S-19	Canoe Lake	Schoolcraft	9 mi. E of Melstrand	2	x	x	x	x		5			Grand Sable State Forest
S-20	Cusino Lake	Schoolcraft	24 mi. NE of Munising	4	x	x		x		4			Grand Sable State Forest
S-21	Stanley Lake	Schoolcraft	15 mi. NW of Seney	5	x	x	x	x		5			Grand Sable State Forest
S-22	Garnet Lake	Mackinac	1 mi. E of Garnet	5	x	x		x		7			Mackinac State Forest
S-23	Little Brevoort Lake	Mackinac	2 mi. E of Brevoort	6	x	x	x	x		12			Mackinac State Forest
S-24	Black River	Mackinac	2 mi. SE of Gilchrist	6	x			x		4			Mackinac State Forest
S-25	Hog Island Point	Mackinac	7 mi. E of Naubinway	16	x	x		x		55			Mackinac State Forest
S-26	Milakokia Lake	Mackinac	7 mi. W of Gould City	6	x	x		x		10			Mackinac State Forest
S-27	West Branch	Schoolcraft	19 mi. N of Manistique	[illegible]	x			x		5			Manistique River State Forest
S-28	Mead Creek	Schoolcraft	8 mi. SW of Germfask	3	x			x		9			Manistique River State Forest
S-29	Merwin Creek	Schoolcraft	12 mi. NE of Manistique	4	x			x		10			Manistique River State Forest
S-30	West Branch	Dickinson	8 mi. N of Ralph	4	x			x		6			Sturgeon River State Forest
S-31	Lower Dam	Dickinson	12 mi. N of Ralph	2	x			x		4			Sturgeon River State Forest
S-32	Kate's Lake	Dickinson	14 mi. N of Ralph	3	x			x		5			Sturgeon River State Forest
S-33	Carney Lake	Dickinson	9 mi. N of Norway	4	x			x		11			Sturgeon River State Forest
S-34	Anderson Lake	Marquette	10 mi. SW of Gwinn	3	x	x		x		10			Escanaba State Forest
S-35	Little Lake	Marquette	6 mi. E of Gwinn	1	x	x		x		4			Escanaba State Forest
S-36	Escanaba River	Marquette	10 mi. W of Rock	2	x			x		6			Escanaba State Forest
	ZONE 3												
S-37	Michilimackinac State Park	Emmet	in Mackinaw City	27	x	x		x	x	100			on Straits of Mackinac
S-38	Wilderness State Park	Emmet	11 mi. SW of Mackinaw City	6,58[illegible]	x	x	x	x		205	x	x	on Straits of Mackinac
S-39	Young State Park	Charlevoix	2 mi. N of Boyne City	563	x	x	x	x		127			on Lake Charlevoix

GREAT LAKES-ILLINOIS RIVER BASIN PROJECTS
RECREATION INVENTORY
LAKE MICHIGAN BASIN

STATE													
SITE NO.	NAME	COUNTY	LOCATION	AREA (acres)	WATER ORIENTED	SWIMMING	BOATING	FISHING	PICNICKING	TENT CAMPING	TRAILER CAMPING	GROUP CAMPING	REMARKS
S-40	D. H. Day State Park	Leelanau	2 mi. W of Glen Haven	2,050	x	x	x	x	x	125	x		on Lake Michigan
S-41	Benzie State Park	Benzie	6 mi. NW of Honor	2,255	x	x	x	x	x	125	x		on Lake Michigan & Platte R.
S-42	Traverse City State Park	Grand Traverse	2 mi. E of Traverse City	39	x	x	x	x	x	326			on Grand Traverse Bay
S-43	Interlochen State Park	Grand Traverse	1 mi. S of Interlochen	187	x	x	x	x	x	487		x	on Duck Lake
S-44	Higgins Lake, Unit #2	Crawford	1 mi. off I-75	Unknown	x	x		x	x	85			on N side of Higgins Lake
S-45	Higgins Lake State Park	Roscommon	9 mi. SW of Roscommon	305	x	x	x	x	x	497			on Higgins Lake
S-46	William Mitchell State Park	Wexford	in Cadillac	32	x	x	x	x	x	180			on Lakes Mitchell and Cadillac
S-47	Orchard Beach State Park	Manistee	2 mi. N of Manistee	201	x	x			x	180			on Lake Michigan
S-48	Ludington State Park	Mason	8 mi. N of Ludington	3,711	x	x	x	x	x	299		x	on Lake Michigan
S-49	Charles Mears State Park	Oceana	3 mi. N of Manistee	49	x	x	x	x	x	90			on Lake Michigan
S-50	Silver Lake State Park	Oceana	7 mi. W of Hart	1,852	x	x	x	x	x	202			on Lake Michigan
S-51	White Cloud State Park	Newaygo	in White Cloud	89	x			x	x	45			on White River
S-52	Muskegon State Park	Muskegon	4 mi. W of North Muskegon	1,125	x	x	x	x	x	184			on Lake Michigan
S-53	Lake [illegible]	Benzie	1½ mi. SW of Village	3	x	x	x	x		12	x		Fife Lake State Forest
S-54	Platte River	Benzie	4 mi. SE of Honor	2	x	x	x	x		12	x		Fife Lake State Forest
S-55	Grass Lake	Benzie	3½ mi. N of Thompsonville	5	x		x	x		8	x		Grass Lake Dam impoundment
S-56	Beaver Island	Charlevoix	Beaver Island	10	x	x	x	x	x	12	x		on Lake Michigan
S-57	Arbutus Lake No. 4	Grand Traverse	7 mi. SE of Traverse City	5	x	x	x	x		30	x		Fife Lake State Forest
S-58	Arbutus Lake No. 5	Grand Traverse	on Arbutus Lake	2		x				7			
S-59	Brown's Dam	Grand Traverse	4 mi. NE of Kingsley	2	x	x	x	x		10	x		on Boardman River
S-60	Fork Camp	Grand Traverse	7 mi. N Fife Lake	2	x		x	x		10	x		on Boardman River
S-61	Scheck's Place	Grand Traverse	6 mi. NE of Mayfield	10	x			x		16	x		on Boardman River
S-62	Spider Lake	Grand Traverse	3 mi. N of Mayfield	2	x		x	x		10	x		Fife Lake State Forest
S-63	Spring Lake	Grand Traverse	1 mi. S of Fife Lake	5	x		x	x		10	x		Fife Lake State Forest
S-64	Bray Creek	Lake	3 mi. NE of Baldwin	7	x			x		8	x		on Baldwin River
S-65	Little Leverentz Lake	Lake	2 mi. E of Luther	3	x		x	x		4	x		Pere Marquette State Forest
S-66	Silver Creek	Lake	5 mi. N of Luther	12	x			x		20	x		Pere Marquette State Forest
S-67	Healy Lake	Manistee	7 mi. SW of Copemish	3	x	x	x	x		8	x		Fife Lake State Forest
S-68	Goose Lake	Missaukee	3 mi. NW of Lake City	20	x	x	x	x		20	x		Houghton Lake State Forest
S-69	Reedsburg Dam	Missaukee	5 mi. NW of Houghton Heights	20	x	x	x	x		44	x		Houghton Lake State Forest
S-70	Whitlock Lake	Missaukee	6 mi. NW of Lake City	5	x	x	x			6	x		Houghton Lake State Forest
S-71	Long Lake	Wexford	8 mi. NE of Cadillac	1	x	x	x	x		5	x		Fife Lake State Forest
S-72	Manistee Bridge	Crawford	8 mi. W of Grayling	5	x			x		12	x		Au Sable State Forest
S-73	Manistee River Camp No. 1	Crawford	12 mi. NW of Grayling	4	x			x		6	x		Au Sable State Forest
S-74	Manistee River Camp No. 2	Crawford	12 mi. NW of Grayling	5	x			x		6	x		Au Sable State Forest
S-75	Muskegon River Canoe Camp No. 1	Roscommon	13 mi. N of Harrison	20	x		x	x	x	7	x		Houghton Lake State Forest
S-76	Muskegon River Canoe Camp No. 2	Roscommon	12 mi. N of Harrison	5	x		x	x	x	4	x		Houghton Lake State Forest
S-77	Muskegon River Canoe Camp No. 3	Roscommon	12 mi. N of Harrison	5	x		x	x	x	4	x		Houghton Lake State Forest
S-78	Higgins Lake	Crawford	Transferred to State (July 1, 1963)										
S-79	Houghton Lake	Roscommon	5 mi. N of Junction I-75&M-55	5	x	x	x	x		50	x		Houghton Lake State Forest
S-80	Big Mud Lake	Grand Traverse	1½ mi. NW of Interlochen	5	x		x	x		20	x		Fife Lake State Forest
S-81	Long Lake	Missaukee	3½ mi. NW of Lake City	5	x	x		x		9	x		Houghton Lake State Forest
S-82	Guernsey Lake	Kalkaska	8 mi. W of Kalkaska	6	x		x	x	x	20	x		part of Cross State Horse Tr.
S-83	Deadmans Hill	Antrim		10						5			overlooks Jordan Valley
S-84	Temple	Clare	1/2 mi. SW of Temple	15	x	x	x	x	x	10	x		on Muskegon River
S-85	Carrierville	Lake	2½ mi. W of Luther		x			x	x	6	x		on Manistee River
S-86	Bells Bay	Charlevoix	3 mi. SW of Charlevoix		x	x				7	x		Pigeon River State Forest
S-87	Lake Marquette	Crawford	4 mi. W of Grayling		x	x	x	x		47	x		Au Sable State Forest

GREAT LAKES - ILLINOIS RIVER BASIN PROJECTS
RECREATION INVENTORY
LAKE MICHIGAN BASIN

STATE													
SITE NO.	NAME	COUNTY	LOCATION	AREA (acres)	WATER ORIENTED	SWIMMING	BOATING	FISHING	PICNICKING	TENT CAMPING	TRAILER CAMPING	GROUP CAMPING	REMARKS
	ZONE 4												
S-88	Warren Dunes State Park	Berrien	17 mi. S of St. Joseph	1,415	x	x			x	137	x	x	on Lake Michigan
S-89	Grand Haven State Park	Ottawa	1 mi. SW of Grand Haven	48	x	x			x	234	x		on Lake Michigan
S-90	Holland State Park	Ottawa	7 mi. W of Holland	43	x	x		x	x	176	x		on Lake Michigan
S-91	Yankee Spring Recreation Area	Barry	12 mi. W of Hastings	4,284	x	x	x	x	x	252	x		on Gun Lake
S-92	Fort Custer Recreation Area	Kalamazoo	7 mi. SW of Battle Creek	1,228									
S-93	Indiana Dunes State Park	Porter	N of Chesterton	2,182	x	x	x	x	x	40	x		
S-94	Pokagon State Park	Steuben	6 mi. N of Angola	956	x	x	x	x	x	200	x		winter sports
S-95	G. S. Porter State Memorial	Noble	8 mi. NW of Kendallville										historic
S-96	Ely Lake	Allegan	9 mi. W of Allegan	15	x	x	x	x	x	90	x		Allegan State Forest
S-97	Lakeview	Allegan	5 mi. W of Allegan	3	x		x	x	x	8	x		on Kalamazoo River
S-98	Pine Point	Allegan	6 mi. W of Allegan	6	x		x	x	x	9	x		Allegan State Forest
S-99	Silver Creek	Allegan	12 mi. NW of Allegan	2	x		x	x	x	8	x		Allegan State Forest
S-100	Swan Creek	Allegan	7 mi. W of Allegan	1	x		x	x	x	6	x		Allegan State Forest

GREAT LAKES-ILLINOIS RIVER BASIN PROJECTS
RECREATION INVENTORY
LAKE MICHIGAN BASIN

LOCAL — ZONE I

SITE NO.	NAME	COUNTY	LOCATION	AREA (acres)	WATER ORIENTED	SWIMMING	BOATING	FISHING	PICNICKING	TENT CAMPING	TRAILER CAMPING	GROUP CAMPING	REMARKS
L-1	Pamperin Park	Brown	on Duck Creek	75	x				x				6000' frontage on Creek
L-2	E. J. Smith Park	Brown	West of Green Bay	30	x				x				nature study area
L-3	Calumet County Park	Calumet	on Lake Winnebago	200	x		x	x	x	x	x		mounds, escarpment
L-4	Bailey's Harbor Ridges Park	Door	on Lake Michigan	39	x	x			x				beach, wild flowers
L-5	Cave Point Park	Door	on Lake Michigan	19	x				x				rock ledges over lake
L-6	Chaudoir Dock Park	Door	on Green Bay	8	x		x	x	x				fishing
L-7	Door Bluff Headlands	Door	on Garret Bay	123									no improvements-natural area
L-8	Ellison Bay Bluff	Door	on Green Bay	106	x								high cliff over water
L-9	Robert LaSalle Park	Door	on Lake Michigan	6	x	x			x				historical site
L-10	Lyle-Harter-Matter Sanctuary	Door	near Bailey's Harbor	40									no improvements-natural area
L-11	Meridian Park	Door	near Egg Harbor	92					x				mid-way equator to NP
L-12	Frank E. Murphy Park	Door	on Green Bay	11	x	x	x	x	x				beach
L-13	Sugar Creek Park	Door	on Green Bay	41	x	x			x				swimming beach
L-14	Tornado Memorial Park	Door	SW of Sturgeon Bay	3					x				memorial to disaster
L-15	Washington Isle Park	Door	Washington Island	5	x	x			x				view over lake, beach
L-16	Keyes Lake Park	Florence	on Keyes Lake	5	x	x	x	x	x	x	x		beach
L-17	Lake Emily Park	Florence	on Lake Emily	39	x	x		x	x				swimming beach
L-18	Sand Lake Park	Florence	on Sand Lake	48	x	x		x	x	x	x		trout fishing
L-19	West Bass Lake Park	Florence	on West Bass Lake	47	x	x		x	x		x		beach
L-20	Columbia Park	Fond du Lac	on Lake Winnebago	3	x		x	x	x	x	x	x	lake
L-21	Roosevelt Park	Fond du Lac	on Lake Winnebago	½	x	x			x				beach
L-22	Lake Metonga Park	Forest	on Lake Metonga	78	x								
L-23	Hattie Sherwood Park	Green Lake		Unknown	x	x	x	x					water
L-24	Dodge Park	Green Lake	on Green Lake	68	x	x			x	x			recreation
L-25	Green Lake County Park	Green Lake	on Green Lake	15	x	x	x	x					recreation
L-26	Petrifying Springs Park	Kenosha	north of Kenosha	350					x				woods, nature study
L-27	Bolt Lake Park	Kewaunee	north of Bolt	½	x		x	x	x				fishing
L-28	Bruemmerville Park	Kewaunee	near Algoma	17					x			x	
L-29	Bruemmer-Kewaunee Park	Kewaunee	northwest of Kewaunee	32	x			x	x				zoo
L-30	Krehns Lake Park	Kewaunee	on Silver Lake	2	x		x	x	x				fishing
L-31	Red River Park	Kewaunee	on Lake Michigan	12	x	x		x	x			x	fishing
L-32	West Alaska Lake Park	Kewaunee	on West Alaska Lake	1	x								
L-33	Elderon Park	Marathon	on Lilly Lake	25	x				x	x	x		
L-34	Bay Shore Park	Marinette	south of Marinette	10	x	x	x	x	x				boating, fishing
L-35	Dave Falls Park	Marinette	west of Amberg	40	x			x	x				trout fishing-swimming pool
L-36	Lake Noquebay Park	Marinette	on Lake Noquebay	20	x	x	x	x	x				fishing
L-37	Menominee River Park	Marinette	southeast of Wagner	40	x			x	x				fishing
L-38	Twin Bridge Park	Marinette	on High Falls drainage	30	x	x	x	x	x	x	x		85' dam
L-39	Camp Bird Youth Camp	Marinette	near Sand Lake	160	x	x	x	x	x	x	x	x	largest Norway pine
L-40	Goodman Park	Marinette	on Peshtigo River	70	x			x	x	x	x		fishing, logging relic
L-41	McClintock Park	Marinette	at Silver Cliff	200	x				x	x	x		woods
L-42	Morgan Park	Marinette	on Timm's Lake	120	x	x	x	x	x	x	x	x	woods and rocks
L-43	Twelve Foot Falls	Marinette	on Pike River	80	x			x	x	x			waterfalls, fishing
L-44	Veterans Memorial Park	Marinette	on Thunder River	320	x			x	x	x	x		waterfalls, fishing, pool
L-45	Dahl Park	Marinette	3 miles SW of Marinette	5					x				
L-46	Michaelis Park	Marinette	on Green Bay, S of Marinette	2	x		x	x	x				
L-47	Don Runnoe Memorial Park	Marinette	S edge Marinette	10	x	x		x	x				
L-48	Long Slide Falls	Marinette	6 miles NE of Pembine		x			x					fishing, undeveloped, scenic

GREAT LAKES-ILLINOIS RIVER BASIN PROJECTS
RECREATION INVENTORY
LAKE MICHIGAN BASIN

LOCAL — ZONE I

SITE NO.	NAME	COUNTY	LOCATION	AREA (acres)	WATER ORIENTED	SWIMMING	BOATING	FISHING	PICNICKING	TENT CAMPING	TRAILER CAMPING	GROUP CAMPING	REMARKS
L-49	Badger Park	Marinette	Peshtigo	25	x	x	x	x		x	x		fishing, swimming
L-50	Muir Memorial Park	Marquette	on Muir Lake	42	x		x	x	x	x	x		memorial marker
L-51	Kelly Lake	Oconto	6 miles NE Suring		x			x	x	x	x		lake access
L-52	Bay Shore Park, Forestry Park #1	Oconto	on Green Bay	12	x	x			x	x	x		beach
L-53	Gillett City Park	Oconto	at Gillett						x	x	x		
L-54	Chute Pond	Oconto	northwest of Suring	120	x	x	x	x	x	x	x	x	rock outcrops, bluffs
L-55	Oconto City Park	Oconto	S of Oconto		x	x			x	x	x		on Green Bay
L-56	Leigh Lake Park	Oconto	northeast of Suring	40	x					x			
L-57	Village of Lena	Oconto	at Lena							x	x		
L-58	North Bay Shore Park, Forestry #2	Oconto	on Green Bay	18	x	x	x	x	x	x			beach
L-59	Village of Suring	Oconto	at Suring						x	x			on Oconto River
L-60	Pioneer Memorial Park	Oconto	Near stiles	52					x	x	x		woods
L-61	Wheeler Park	Oconto	on Wheeler flowage	5	x				x	x			
L-62	Grignon Home	Outagamie	on Fox River	31					x				early settler's home
L-63	Plamann Park	Outagamie	north of Appleton	130					x	x			under development
L-64	Covered Bridge Park	Ozaukee	on Cedar Creek	7	x				x				covered bridge
L-65	Ehlers Park	Ozaukee	on Milwaukee River	6	x			x	x				
L-66	Virmond Park	Ozaukee	on Lake Michigan	62	x	x	x	x	x	x			beach
L-67	Waubedonia Park	Ozaukee	on Milwaukee River	43	x		x	x	x	x		x	
L-68	Collins Park	Portage	on Collins Lake	23	x	x	x	x	x				recreation
L-69	Lake Emily Park	Portage	northwest of Amherst	30	x	x	x	x	x		x		lake, Indian mounds
L-70	Three Lakes Park	Portage	northeast of Rosholt	6	x		x	x	x				lakes
L-71	Prichard Park	Racine	on Root River	45					x				
L-72	Old Settlers Park	Racine	near Union Grove	12					x				
L-73	Forest Park	Racine	south of Racine	80					x				
L-74	Evans Park	Racine	near Ives Grove	22					x				
L-75	Sanders Park	Racine	2 miles S Racine	80					x	x			
L-76	Shawno County Park	Shawno	on Shawno Lake	36	x	x	x	x	x	x	x	x	recreation
L-77	Wilson Lake Park	Shawno	south of Wittenburg	9	x	x	x		x				swimming
L-78	Cecil Park	Shawno	at Cecil	Unknown	x	x	x	x	x	x	x		fishing, swimming
L-79	Broughton Marsh Park	Sheboygan	northwest of Elkhart	14,000	x		x	x	x	x	x		fishing, hunting
L-80	Gill's Landing	Waupaca	on Wolf River	11	x		x	x					fishing, camping
L-81	Keller Park	Waupaca	on Little Lake	37	x	x	x	x	x				beach, fishing
L-82	Unnamed park	Waupaca	on Chain of Lakes	16	x								
L-83	Winneconne Park	Winnebago	on Winneconne Lake	24	x	x	x	x	x				recreation, beach
MILWAUKEE COUNTY PARKS			MAP COORDINATES										
L-84	Bay View	Milwaukee	K-15	In L-127	x				x				on Lake Michigan, beach
L-85	Big Bay	Milwaukee	J-7	7.5	x	x			x				on Lake Michigan
L-86	Bradford	Milwaukee	K-10	In L-115	x	x							on Lake Michigan
L-87	Brown Deer	Milwaukee	G-4	368	x		x		x				boating, lagoon
L-88	Caesar's Pool	Milwaukee	J-10	2	x								wading pool
L-89	Carver	Milwaukee	H-10	10.5	x	x			x				swimming pool
L-90	Clarke Square	Milwaukee	G-13	2	x				x				wading pool
L-91	Concordia	Milwaukee	C-9	8	x								wading pool
L-92	Cooper	Milwaukee	C-9	8	x				x				wading pool
L-93	Currie	Milwaukee	B-8	217									golf course
L-94	Doctors	Milwaukee	J-3	49.5	x	x			x				on Lake Michigan
L-95	Estabrook	Milwaukee	I-8	115	x			x	x			x	on Milwaukee R., day camp

GREAT LAKES-ILLINOIS RIVER BASIN PROJECTS
RECREATION INVENTORY
LAKE MICHIGAN BASIN

LOCAL — ZONE I

SITE NO.	NAME	COUNTY	LOCATION	AREA (acres)	WATER ORIENTED	SWIMMING	BOATING	FISHING	PICNICKING	TENT CAMPING	TRAILER CAMPING	GROUP CAMPING	REMARKS
L-96	Garfield	Milwaukee	I-9	9	x								wading pool
L-97	Gordon	Milwaukee	J-9	14	x	x		x	x				on Milwaukee R., swim pool
L-98	Grant	Milwaukee	L-19	360	x				x			x	on L. Mich., beach, day camp
L-99	Greenfield	Milwaukee	WA-15	287	x	x	x	x	x			x	on Root River, swimming pool
L-100	Holler	Milwaukee	H-17	16	x	x						x	swimming pool, day camp
L-101	Hoyt	Milwaukee	C-10	35	x	x						x	on Menomonee R., swimming pool
L-102	Humboldt	Milwaukee	I-15	70.6	x		x	x	x				boating, fishing, lagoon
L-103	Jackson	Milwaukee	K-14	117	x	x	x	x	x			x	on Kinnickinnic R., swim
L-104	Jacobus	Milwaukee	E-11	29.5					x			x	day camp
L-105	Juneau	Milwaukee	J-11	17.3	x		x	x	x				on Lake Michigan
L-106	Kern	Milwaukee	J-9	28.3	x			x	x				on Milwaukee River
L-107	Kletzsch	Milwaukee	H-5	119	x			x	x			x	on Milwaukee River
L-108	Kosciuszko	Milwaukee	H-14	35	x	x	x	x	x				boating, fishing, lagoon
L-109	Lake	Milwaukee	K-9	137	x			x	x			x	on L. Mich., day camp
L-110	Lincoln	Milwaukee	H-7	305	x			x	x			x	on Milwaukee R., day camp
L-111	Lindbergh	Milwaukee	H-8	2.5	x				x				wading pool
L-112	Lyons	Milwaukee	E-15	13	x								wading pool
L-113	McCarty	Milwaukee	D-15	60.6	x	x	x	x	x			x	on Honey Creek, swimming pool
L-114	McGovern	Milwaukee	R-6	73.5	x	x	x	x	x			x	boating, fishing, swim pool
L-115	McKinley	Milwaukee	J-10	14.8	x	x	x	x	x				on Lake Michigan, boat ramp
L-116	Mitchell	Milwaukee	G-12	60.8	x		x	x	x				boating, fishing, lagoon
L-117	Pleasant Valley	Milwaukee	J-9	7.3	x			x					on Milwaukee River
L-118	Pulaski-Cudahy	Milwaukee	K-8	16					x			x	day camp
L-119	Pulaski-Milwaukee	Milwaukee	H-14	17.8	x								on Kinnickinnic R., wading pool
L-120	Rawson	Milwaukee	K-20	28					x				
L-121	Red Arrow	Milwaukee	H-12	3.5	x								wading pool
L-122	Riverside	Milwaukee	J-9	21	x				x				on Milwaukee River
L-123	Saveland	Milwaukee	I-16	3.9	x			x	x				fishing, lagoon, wading pool
L-124	Sheridan	Milwaukee	L-17	66.3	x	x		x	x			x	on L. Michigan, swimming pool
L-125	Sherman	Milwaukee	F-9	21	x							x	wading pool, day camp
L-126	Smith	Milwaukee	G-6	20	x				x				wading pool
L-127	South Shore	Milwaukee	J-15	77	x		x	x	x				on L. Michigan, boat ramp
L-128	Walker Square	Milwaukee	H-13	2	x				x				wading pool
L-129	Warnimont	Milwaukee	L-8	48.8					x				
L-130	Washington	Milwaukee	F-11	130.5	x		x	x	x				wading pool, fish, boat lagoon
L-131	West Milwaukee	Milwaukee	14-F	20	x				x				wading pool
L-132	Whitnall	Milwaukee	C-19	635					x			x	day camp
L-133	Wilson	Milwaukee	H-16	78.5	x		x	x	x				boating, fishing in lagoon
L-134	Wisconsin Avenue Park	Milwaukee	B-11	3.4					x			x	day camp
L-135	Honey Creek Parkway	Milwaukee	H	[illegible]	x				x				along Honey Creek
L-136	Kinnickinnic Parkway	Milwaukee	15	240.6	x			x					along Kinnickinnic River
L-137	Menomonee River Parkway	Milwaukee	B	666.5	x			x	x			x	along Menomonee R. day camp
L-138	Milwaukee River Parkway	Milwaukee	H	116.4	x								along Milwaukee River
L-139	Oak Creek Parkway	Milwaukee	20	960	x		x	x				x	day camp, boat ramp
L-140	Root River Parkway	Milwaukee	B	2,900	x			x	x			x	along Root River, day camp
L-141	Underwood Creek Parkway	Milwaukee	A	224					x			x	day camp

GREAT LAKES-ILLINOIS RIVER BASIN PROJECTS
RECREATION INVENTORY
LAKE MICHIGAN BASIN

LOCAL — ZONE 2

SITE NO.	NAME	COUNTY	LOCATION	AREA (acres)	WATER ORIENTED	SWIMMING	BOATING	FISHING	PICNICKING	TENT CAMPING	TRAILER CAMPING	GROUP CAMPING	REMARKS
L-142	Bark River	Delta	1 mi. W of Bark River		x		x	x	x	x	10		hardwood grove
L-143	Fish Dam	Delta	1½ mi. N of Garden Corners	166	x			x	x	x	x		trout fishing
L-144	O. B. Fuller	Delta	12 mi. S of Escanaba	94	x			x	x	x	x		
L-145	Gladstone (Wilderness)	Delta	at Gladstone	25	x	x	x	x		x	100		
L-146	Lighthouse Point	Delta	4½ mi. N of Stonington							x	x		
L-147	Pioneer Trail Park	Delta	2 mi. N of Escanaba	98	x				x	x	50		stand of pines
L-148	Rapid River Falls	Delta	6 mi. N of Rapid River	40	x				x	x	x		scenic falls
L-149	Sac Bay	Delta	14 mi. SW of Garden	63	x	x		x	x	x	x		Lake Michigan Bay
L-150	Twin Springs	Delta	7 mi. SE of Rapid River	35	x	x		x	x		10		Lake Michigan Bay
L-151	Van Cleve	Delta	at Gladstone		x	x		x	x	x	x		
L-152	Tourist Camp	Delta	W end of Rapid River							x	15		
L-153	Lake Mary	Dickinson	2 mi. S of Loretto	5	x	x	x	x		x	10		
L-154	Marion Park	Dickinson	1 mi. S of Norway						x		12		
L-155	Norway Lake	Dickinson	6 mi. N of Felch	15	x	x	x	x	x	x	12		
L-156	Sawyer Lake	Dickinson	4 mi. N of Channing	14	x	x	x	x	x	x	10		
L-157	Lake Antone	Dickinson	1 mi. NE Iron Mountain	24	x	x	x	x	x	x			
L-158	Holmes Park	Iron	6 mi. S Golden Lake Cp Gnd.		x	x	x	x	x	x	15		on Little Smokey Lake
L-159	Bates TWP	Iron	5 mi. NW of Iron River		x	x		x					on Sunset Lake
L-160	Bewabic Park	Iron	4 mi. W of Crystal Falls	186	x	x	x	x		x	20		
L-161	Dawson Lake	Iron	10 mi. E of Crystal Falls		x					x	x		
L-162	Gibson Lake	Iron	11 mi. N of Crystal Falls		x	x		x		x	x		
L-163	Hagerman Lake (Stanbaugh TWP)	Iron	8 mi. SW of Iron River		x	x	x	x		x	x		
L-164	Horse Race Rapids	Iron	10 mi. SE of Crystal Falls					x		x	x		on Point River
L-165	Iron Lake	Iron	4 mi. N Iron River		x	x		x		x	x		
L-166	Mansfield TWP Park	Iron	5 mi. W of Sagola		x	x	x	x		x	x		on Dawson Lake
L-167	Mastodam TWP Park	Iron	5 mi. S of Alpha	1	x	x	x	x		x	x		on S[illegible]ager Lake
L-168	Mastodam TWP Park (Buck Lake)	Iron	3½ mi. SW of Alpha	2	x		x	x		x	x		
L-169	Mastodam TWP Park (Comey Dam)	Iron	4 mi. S of Alpha		x		x	x		x	x		
L-170	Ne-Squah-Cum-E	Iron	10 mi. NE Iron River		x			x		x	x		U of M camp
L-171	Pentoga Park	Iron	8 mi. W of Alpha	157	x	x		x		x	20		
L-172	Runkel Lake	Iron	at Crystal Falls	20	x	x	x	x		x	30		
L-173	Stambaugh TWP Park	Iron	1 mi. N of Stambaugh		x	x		x		x	x		
L-174	Sunset Lake	Iron	2 mi. E of Iron River		x	x		x		x	x		
L-175	Trout or Holmes Lake	Iron	7 mi. W of Iron River		x	x		x		x	x		
L-176	Van Platen Fox	Iron	7 mi. W of Beechwood		x			x		x	x		on Golden Lake
L-177	Iron River TWP Park	Iron	5½ mi. W of Iron River						x				
L-178	Tepee Lake	Iron	12 mi. N of Elmwood		x	x	x	x					in Ottawa National Forest
L-179	Luce County Park	Luce	1 mi. NW of Helmer		x	x		x		x	x		
L-180	Township Park	Mackinac	10 mi. S of Gould City		x	x	x			x	x		
L-181	Epoufette TWP Park	Mackinac	6 mi. W Brevort on US-2		x	x				x	10		on Lake Michigan
L-182	Gwinn Co. Park and Campground	Marquette	at Gwinn	20	x	x			x	x	12		
L-183	Michigamme	Marquette	1 mi. E of Michigamme		x	x		x		x	x		on Lake Michigamme
L-184	Republic Park	Marquette	W of Republic on M-95		x		x	x					on dam backwater
L-185	Airport Park	Menominee	at Menominee						x	x	x		
L-186	Bailey Park	Menominee	15 mi. N Menominee		x	x			x	x	x		
L-187	Chain-O-Lakes	Menominee	10 mi. W of Stephenson		x	x		x		x	x		
L-188	County Park	Menominee	12 mi. N of Menominee		x		x	x		x	x		on Menominee River
L-189	Fox Park	Menominee	5 mi. N of Cedar River		x	x		x	x	x	x		

GREAT LAKES-ILLINOIS RIVER BASIN PROJECTS
RECREATION INVENTORY
LAKE MICHIGAN BASIN

LOCAL — ZONE 2

SITE NO.	NAME	COUNTY	LOCATION	AREA (acres)	WATER ORIENTED	SWIMMING	BOATING	FISHING	PICNICKING	TENT CAMPING	TRAILER CAMPING	GROUP CAMPING	REMARKS
L-190	Hermansville Woodland	Menominee	at Hermansville							x	x		
L-191	Kleinke Park	Menominee	15 mi. N of Menominee		x	x	x	x	x	x			on Green Bay
L-192	Mellen TWP Park	Menominee	1 mi. S of Wallace							x	x		
L-193	Remene Falls Park	Menominee	13 mi. W of Carney		x			x		x	x		falls
L-194	River Park	Menominee	near Menominee		x	x		x	x	x	x		
L-195	Rochereau Park	Menominee	13 mi. N of Menominee		x	x	x	x		x	x		on Green Bay
L-196	Shakey Lakes	Menominee	12 mi. W of Stephenson	340	x	x	x	x	x	x	50		
L-197	Twin Island	Menominee	15 mi. NW of Menominee							x	x		on Menominee Ri er
L-198	Veterans Park	Menominee	4½ mi. NW of Hermansville							x	x		
L-199	Veterans Memorial	Menominee	¼ mi. W of Powers		x	x			x	x	x		
L-200	Wallace	Menominee	at Wallace		x			x		x			
L-201	Mason Park	Menominee	4 mi. NW of Menominee										on Menominee River
L-202	Henes Park	Menominee	2 mi. N of Menominee		x				x				on Green Bay
L-203	Stephenson Island	Menominee	Between Menominee & Marinette		x				x				
L-204	Doyle TWP Park	Schoolcraft	1 mi. W of Gulliver		x	x		x		x	x		
L-205	Dodge Lake	Schoolcraft	9 mi. N of Manistique		x			x					

GREAT LAKES - ILLINOIS RIVER BASIN PROJECTS
RECREATION INVENTORY
LAKE MICHIGAN BASIN

LOCAL — ZONE 3

SITE NO.	NAME	COUNTY	LOCATION	AREA (acres)	WATER ORIENTED	SWIMMING	BOATING	FISHING	PICNICKING	TENT CAMPING	TRAILER CAMPING	GROUP CAMPING	REMARKS
L-206	Lincoln Park	Emmet	½ mile S of Carp Lake		x	x	x	x	x				on Carp Lake
L-207	Petoskey City Park	Emmet	in Petoskey		x	x	x	x	x	x	x		on Little Traverse Bay
L-208	Wawatam Township Park	Emmet	3 miles SW of Mackinaw City		x	x	x						
L-209	Whiting Park	Charlevoix	4 miles NW Boyne City	375	x	x	x	x					on Lake Charlevoix
L-210	St. James Township Park	Charlevoix	on Beaver Island	5	x	x		x	x	x			on Lake Michigan
L-211	Alden Village Park	Antrim	in village of Alden	3	x	x	x	x		x			on Torch Lake
L-212	Palmer Park	Antrim	in Mancelona	20						x			village park
L-213	Mancelona	Antrim	3 miles NE Mancelona	2	x	x	x	x		x	x		on Lake Wetzel
L-214	Milton	Antrim	2½ miles E Kewadin		x	x		x		x	x		on Torch Lake
L-215	Forest Home Park	Antrim	6 miles S of Eastport	1	x	x	x	x		x			on Torch Lake
L-216	Elk Rapids	Antrim	in Elk Rapids	3	x	x	x	x	x	46	x		on Grand Traverse Bay
L-217	Barnes County Park	Antrim	in Eastport	60	x		x	x	x	10	5		on Grand Traverse Bay
L-218	Banks	Antrim	2 miles W of Atwood	2	x	x		x		x	x		on Grand Traverse Bay
L-219	Central Lake	Antrim	at Central Lake	6	x	x	x	x	x	6	x		on Intermediate Lake
L-220	Custer Township Park	Antrim	5 miles W of Mancelona	40	x	x		x		x	x		on Lake of the Woods
L-221	Ellsworth	Antrim	in Ellsworth	2	x	x	x			x	x		on Ellsworth Lake
L-222	Echo	Antrim	5 miles SE of Ellsworth	1	x	x	x			x	x		on Six Mile Lake
L-223	Craven Park	Antrim	½ mile E of Bellaire	20	x	x	x	x	x				on Blair Lake
L-224	Richardi Village Park	Antrim	in Bellaire	1	x	x			x				on Intermediate River
L-225	Old Settler's Picnic grounds	Leelanau	4 miles W of Maple City	4	x	x		x	10				on Glen Lake
L-226	Lighthouse Point	Leelanau	8 miles N Freeport	20	x				12	x			
L-227	Empire Park	Leelanau	½ mile W of Empire	3	x	x	x		5				on Lake Michigan
L-228	Cleveland Township Park	Leelanau	5 miles N of Maple City	3	x	x		x	6				on Little Traverse Bay
L-229	Solon Township Park	Leelanau	2½ miles E of Cedar	3	x		x	x	1				on Lake Leelanau
L-230	Centerville Township Park	Leelanau	4 miles S of Village	2	x	x	x	x	x				on Lake Leelanau
L-231	Lake Leelanau Township Park	Leelanau	1 mile NW of Village	1	x	x	x	x	x				on Lake Michigan
L-233	East Leland Township Park	Leelanau	3 miles NE of Leland	2	x	x	x		x				on Lake Leelanau
L-234	Peterson Township Park	Leelanau	2 miles NW of Northport	8	x				x				on Lake Michigan
L-235	Northport Village Park	Leelanau	in Northport	3	x	x		x	x				on Grand Traverse Bay
L-236	Sutton's Bay Village Park	Leelanau	3 miles E of village	4.5	x	x			x				on Sutton's Bay
L-237	Stony Point Roadside Park	Leelanau	6 miles E of village		x	No development							on Sutton's Bay
L-238	Hendryx County Roadside Park	Leelanau	on Lee Point	1	x	x	x	x	x				on Grand Traverse Bay
L-239	Bingham Township Park	Leelanau	7½ miles SW of Sutton Bay	3	x	x	x	x	x				on Lake Leelanau
L-240	Elmwood Township Park	Leelanau	1 mile N of County Line	7	x	x	x		x				on Grand Traverse Bay
L-241	Beulah Trailer Park	Benzie	in Beulah	10	x	x	x				x		on Crystal Lake
L-242	Veterans Memorial Park	Benzie	3½ miles E of Honor	40	x		x	x	x	x	x		on Platte River
L-243	Benzie County Public Beach	Benzie	1 mile N of Beulah	1	x	x	x						on Crystal Lake
L-244	Lake Township Park	Benzie	at Platte River Point	10	x	x	y						on Lake Michigan
L-245	Elberta Village Park	Benzie	1 mile S of Frankfort		x	x			x				on Lake Michigan
L-246	Frankfort Public Beach	Benzie	at Frankfort	3	x	x							on Lake Michigan
L-247	Aral County Park	Benzie	7 miles NE of Honor		x	x							on Lake Michigan
L-248	Gilmore Township Park	Benzie	2 miles S of Frankfort		x	x							on Lake Michigan
L-249	Acme Township Park	Grand Traverse	4 miles NE of Acme		x	x	x	x		x			on Grand Traverse Bay
L-250	Old Mission Point	Grand Traverse	15 miles N of Traverse City	20	x	x		x	x	x			on Grand Traverse Bay
L-251	Whelock Park	Grand Traverse	8 miles SE of Traverse City		x			x					on Long Lake
L-252	Old Mission Harbor	Grand Traverse	15 miles N of Traverse City		x		x	x	x				on Grand Traverse Bay
L-253	Bowers Harbor Park	Grand Traverse	11 miles N of Traverse City		x	x	x	x	x				on Grand Traverse Bay
L-254	White water Park	Grand Traverse	6½ miles NE of Acme		x	x		x	x				on Elk Lake

GREAT LAKES-ILLINOIS RIVER BASIN PROJECTS
RECREATION INVENTORY
LAKE MICHIGAN BASIN

LOCAL — ZONE 3

SITE NO.	NAME	COUNTY	LOCATION	AREA (acres)	WATER ORIENTED	SWIMMING	BOATING	FISHING	PICNICKING	TENT CAMPING	TRAILER CAMPING	GROUP CAMPING	REMARKS
L-255	Lake Billings Park	Wexford	in Manton	6	x	x	x	x		x	x		
L-256	Kenwood City Park	Wexford	in Cadillac	5	x	x	x		x				on Lake Cadillac
L-257	Mesick City Park	Wexford	4 mi. SW of Mesick		x	x	x		x	x	x		on Manistee River
L-258	Sherman Community Park	Wexford	1½ mi. N of Mesick		x				x				on Manistee River
L-259	Artioch TWP Park	Wexford	5½ mi. E of Mesick		x				x				on Carp Lake
L-260	Wexford County Park	Wexford	7 mi. NW of Cadillac		x		x		x				on Woodward Lake
L-261	Missaukee County Park	Missaukee	¼ mi. NW of Lake City	10	x	x	x	x	x	x	x		on Lake Missaukee
L-262	Goose Lake Conservation Park	Missaukee	3 mi. N of Lake City		x	x	x	x	x				
L-263	Boekwalter TWP Park	Missaukee	9 mi. E of McBain						x				
L-264	Richland TWP Park	Missaukee	1½ mi. SW of McBain						x				on Middle Branch Creek
L-265	Steel County Park	Missaukee	3 mi. NW of Falmouth						x				on Clam River
L-266	Log Lake County Park	Kalkaska	3 mi. E of Kalkaska	40	x	x	x	x	x	x	x	x	on Log Lake
L-267	Sands TWP Park	Kalkaska	8 mi. NE of Kalkaska	10	x	x	x	x	x	x	x		on Manistee Lake
L-268	East Lake	Kalkaska	11 mi. E of Kalkaska	2	x	x			x	x			on East Lake
L-269	Croy Lake TWP Park	Kalkaska	3 mi. NE of Lectsville	80					x				on Croy Lake
L-270	Beaver Creek	Crawford	on County Line		x		x	x	x				on Higgins Lake
L-271	Denton TWP Park	Roscommon	½ mi. W of Prudenville		x	x	x	x	x		x		
L-272	Gerrish-Higgins TWP Park	Roscommon	6 mi. W of Roscommon		x	x	x	x	x				on Higgins Lake
L-273	Cormish Village Park	Manistee	in Cormish		x				x				on Lake Cormish
L-274	Pleasanton TWP Park	Manistee	1½ mi. N Village of Bear Lk.		x				x				on Bear Lake
L-275	Hopkins Village Park	Manistee	5 mi. E of Prerport		x	x	x		x	x			on Bear Lake
L-276	Pierport	Manistee	W of M-22, County Road 600		x	x							on Lake Michigan
L-277	Onekama Village Park	Manistee	off M-22 in Onekama		x		x		x				on Portage Lake
L-278	Maple Grove TWP Park	Manistee	1 mi. W of Kaleva						x				on Big Beaver Creek
L-279	Point Camping Grounds	Manistee	in village of Arcadia		x	x	x	x		x			
L-280	Cooley Bridge Park	Manistee	3 mi. E of Wellston		x		x	x	x				on Pine River
L-281	Fifth Street Beach	Manistee	in Manistee		x	x			x				on Lake Michigan
L-282	First Street Beach	Manistee	in Manistee		x	x			x				on Lake Michigan
L-283	Memorial Park	Mason	9 mi. NE of Ludington										on Hamlin Lake
L-284	Bass Lake TWP Park	Mason	8 mi. S of Ludington		x	x			x				on Bass Lake
L-285	Cartier City Park	Mason	1 mi. N of Ludington		x	x			x				on Bass Lake
L-286	Waterworks City Park	Mason	½ mi. NW of Ludington		x	x			x				on Lake Michigan
L-287	Sterns City Park	Mason	in Ludington		x	x			x				on Lake Michigan
L-288	Sheridan TWP Park	Mason	3 mi. N of Walhalla on US-10		x	x		x					on Lake Michigan
L-289	Riverside Municipal Park	Mason	in city of Scottsville		x	x	x		x	x	x		
L-290	Baldwin County Park	Lake	in village of Baldwin		x	x	x		x		x		
L-291	Cecille Lake County Park	Lake	6 mi. SW of Baldwin		x	x	x	x	x				on Cecille Lake
L-292	Rose Lake County Park	Osceola	4 mi. NE of LeRoy	55	x	x	x	x	x				on Rose Lake
L-293	Reed City Tourist Park	Osceola	1 mi. from Reed City	5	x		x	x	x	3	x		on Lake Osceola
L-294	Crittenden County Park	Osceola	5 mi. SE of Evart		x		x	x	x	x			on Big Lake
L-295	Crawford Park	Osceola	7 mi. NE of Evart	1	x	x	x	x		20	x		
L-296	Shingle Lake TWP Park	Clare	½ mi. W of Lake George		x	x	x	x		x	x		
L-297	Lincoln TWP Park	Clare	at village of Lake George	6	x	x	x	x	x	x	x		on Shingle Lake
L-298	Cooks Beach	Clare	4½ mi. SE of Lake		x	x	x	x					on Eight Point Lake
L-299	Mitchell Creek Park	Mecosta	in Big Rapids			UNDER CONSTRUCTION							on Mitchell Creek
L-300	Mecosta Park	Mecosta	in village of Mecosta	72	x	x		x		x	x		
L-301	Veterans Park	Mecosta	6 mi. W of Remus	100	x	x		x	x	x		x	on School Section Lake
L-302	Roger's Dam	Mecosta	3 mi. NW of Standwood	72	x		x	x	x				on Muskegon River

GREAT LAKES-ILLINOIS RIVER BASIN PROJECTS
RECREATION INVENTORY
LAKE MICHIGAN BASIN

LOCAL — ZONE 3

SITE NO.	NAME	COUNTY	LOCATION	AREA (acres)	WATER ORIENTED	SWIMMING	BOATING	FISHING	PICNICKING	TENT CAMPING	TRAILER CAMPING	GROUP CAMPING	REMARKS
L-303	Mecosta County Park	Mecosta	5½ mi. SW of Standwood		x		x	x	x				on Muskegon River
L-304	Latimer Municipal Park	Mecosta	in village of Morley		x	x	x		x	x	x		on shore of impoundment
L-305	Pettibone County Park	Newaygo	3½ mi. NE of Bitely		x	x	x	x	x	x			on Pettibone Lake
L-306	Wildwood County Park	Newaygo	4 mi. W of White Cloud		x		x	x					on Robinson Lake
L-307	Mineral Wells	Newaygo	in White Cloud		x		x	x	x	x	x		2,300 acre lake
L-308	Big Bend Park	Newaygo	3 mi. E of Big Prarie		x	x	x	x					on Hardy Pond
L-309	Oxbow Park	Newaygo	2 mi. NE of Oxbow		x	x	x	x	x	x	x		on Hardy Pond
L-310	Croton Park	Newaygo	at Croton		x	x	x	x	x	x	x		backwater of dam
L-311	Shaw Park	Newaygo	¼ mi. N of Newaygo		x	x	x			x	x		
L-312	Fremont Lake Park	Newaygo	S of Fremont		x	x	x	x	x				on Fremont Lake
L-313	Drummond Park	Newaygo	7 mi. SW of Newaygo		x		x	x					on Muskegon River
L-314	Grant TWP Park	Newaygo	in Grant		x		x	x					on Blanche Lake
L-315	Baptist Lake	Newaygo	11½ mi. E of Grant		x	x	x	x	x				on Baptist Lake
L-316	Crystal Valley Park	Oceana	½ mi. S of Crystal Valley			x		x	x				
L-317	John Gurney Municipal Park	Oceana	in Hart		x	x				x	x		on Hart Lake
L-318	Gales Point Pond	Oceana	5 mi. SE of Hart		x			x					on Gales Pond
L-319	Ferry Dam	Oceana	near Ferry		x			x	x				on Ferry Dam Lake
L-320	Marchville Pond	Oceana	4 mi. SW of Shelby		x			x	x				on Stony Creek
L-321	Claybanks TWP Park	Oceana	2 mi. S of Stony Lake		x	x			x				on Lake Michigan
L-322	Wolf Lake Park	Muskegon	8 mi. NE of Muskegon		x	x		x	x				at Wolf Lake
L-323	Meinert Park	Muskegon	5 mi. NW of Montague	16	x	x			x				on Lake Michigan
L-324	Norton	Muskegon	6 mi. W of Fruitport		x	x			x	x			on Lake Michigan
L-325	Fruitport	Muskegon	½ mi. E of Fruitport		x	x		x					on Spring Lake
L-326	Blue Lake	Muskegon	7 mi. NW of Norton		x	x	x	x	x				on Big Blue Lake
L-327	Pioneer Park	Muskegon	11 mi. NW of Muskegon	300	x	x	x	x	x	x	x		on Lake Michigan
L-328	Lloyd Park	Muskegon	4½ mi. SW of Montague		x	x			x				on Lake Michigan
L-329	Pere Marquette Park	Muskegon	3 mi. W of Muskegon		x	x		x		x			on Lake Michigan
L-330	Mono Lake Park	Muskegon	in Muskegon Heights		x	x			x				on Mono Lake
L-331	Twin Lakes	Muskegon	5 mi. NE of Muskegon	8		x	x	x	x				on Twin Lakes
L-332	Moore County Park	Muskegon	2 mi. N of Casnovia	11	x	x	x	x	x				on Half Moon Lake
L-333	Patterson County Park	Muskegon	3 mi. S of Ravenna	28					x				on Grandi Creek

GREAT LAKES-ILLINOIS RIVER BASIN PROJECTS
RECREATION INVENTORY
LAKE MICHIGAN BASIN

LOCAL — ZONE 4

SITE NO.	NAME	COUNTY	LOCATION	AREA (acres)	WATER ORIENTED	SWIMMING	BOATING	FISHING	PICNICKING	TENT CAMPING	TRAILER CAMPING	GROUP CAMPING	REMARKS
L-334	Dumont Lake County Park	Allegan	5 mi. N of Allegan	5	x	x	x	x	x				
L-335	Gun Lake County Park	Allegan	5 mi. E of Shelbyville	3	x	x	x	x	x				
L-336	West Side County Park	Allegan	1 mi. N of Ganges	12	x	x			x				
L-337	Charlton County Park	Barry	5 mi. E of Hastings	NA	x	x	x	x	x	x			
L-338	Weko Beach Municipal Park	Berrien	in village of Bridgman	NA	x	x	x	x		x	x		
L-339	Rocky Gap County Park	Berrien	in Benton Harbor	3	x	x			x				on Lake Michigan
L-340	Bartek Acres	Berrien	in Niles	NA	x	x		x					
L-341	Bair Lake Woods County Park	Cass	1/2 mi. S of Jones	NA	x	x		x	x				
L-342	Cozy-Shady County Park	Cass	near Vandalia	NA	x	x		x	x				
L-343	Diamond Isle County Park	Cass	2 mi. E of Cassopolis	NA	x	x		x					on Diamond Lake
L-344	Ferndale County Park	Cass	2 mi. E of Edwardburg	NA	x	x	x	x					
L-345	Lake and Forest County Park	Cass	near Vandalia	NA	x	x	x	x					
L-346	North County Park	Cass	near Vandalia	NA	x	x		x					
L-347	Point County Park	Cass	in Cassopolis	NA	x	x		x					
L-348	Harmon (East & West) County Parks	Cass	near Vandalia	NA	x	x		x					
L-349	Lake Lansing	Ingham	1½ mi. N of Haslett	NA	x	x			x				on Lake Lansing
L-350	Clear Lake	Jackson	1 mi. S of Waterloo	[illegible]	x	x		x	x				on Clear Lake
L-351	Gilletts Lake	Jackson	5 mi. E of Jackson	5	x	x		x	x				
L-352	Grass Lake	Jackson	at Grass Lake	10	x	x	x	x	x				
L-353	Little Wolf Lake County Park	Jackson	4½ mi. S of Grass Lake	9	x	x	x	x	x	x	x		
L-354	Minard Lake	Jackson	N of Minard	6	x				x				
L-355	Pleasant Lake County Park	Jackson	2 mi. N of Henrietta	25	x	x	x	x	x	x	x		
L-356	Portage Lake	Jackson	5 mi. SE of Munith	15	x	x		x	x				
L-357	Round Lake	Jackson	5 mi. E of Hanover	4	x	x		x	x				
L-358	Swains Lake County Park	Jackson	2 mi. S of Concord	[illegible]	x	x	x	x	x	x			
L-359	Vandercook	Jackson	1 mi. S of Vandercook	23	x	x		x	x				
L-360	Lime Lake County Park	Jackson	6 mi. SW of Jackson	308	x	x	x	x		x	x		
L-361	Caledonia Lakeside	Kent	at Caledonia Village	35	x			x	x				Emmons Lake
L-362	Chief Hazy Cloud	Kent	at Ada	14	x			x	x				on Grand River
L-363	Coldwater	Kent	5 mi. E of Caledonia	6					x				roadside park
L-364	Fallasburg	Kent	3 mi. N of Lowell	161	x			x	x				covered bridge over Flat River
L-365	Gordon County Park	Kent	1 mi. S of Sand Lake	35					x				playground
L-366	Fred W. Ruehs County Park	Kent	at Alaska Village	5					x				roadside park
L-367	Henry A. Johnson County Park	Kent	1 mi. N of Grandville						x				winter sports, playground
L-368	Long Lake County Park	Kent	6 mi. W of Cedar Springs	[illegible]	x	x		x	x				playground
L-369	Myers Lake County Park	Kent	3 mi. E of Rockford	[illegible]	x	x		x	x				
L-370	Wabasis Lake County Park	Kent	10 mi. SE of Rockford	35	x			x	x				
L-371	White Pine County Park	Kent	11 mi. E of Cedar Springs	[illegible]	x		x	x	x				on Half-mile Lake
L-372	Warren R. Townsend County Park	Kent	in village of Cannonsburg	157	x			x	x				
L-373	Dutton Shadyside	Kent	1/2 mi. S of Dutton	14					x				winter sports
L-374	Douglas Walker	Kent	2 mi. E of Byron Center	20					x				
L-375	Dwight Lydell	Kent	N edge of Comstock Park	35	x			x	x				winter sports
L-376	Paris County Park	Kent	1 mi. SE of Grand Rapids	60					x				
L-377	County Park	Kent	NE edge of Grand Rapids	[illegible]					x				
L-378	Linus C. Palmer City Park	Kent	in Grand Rapids	300					x				
L-379	Crum	Kalamazoo	in Galesburg	NA					x				
L-380	Recreation Park	Kalamazoo	SE edge of Kalamazoo	NA					x				
L-381	Crystal	Montcalm	SW edge of Crystal	NA	x	x			x				on Crystal Lake

GREAT LAKES-ILLINOIS RIVER BASIN PROJECTS
RECREATION INVENTORY
LAKE MICHIGAN BASIN

LOCAL — ZONE 4

SITE	NAME	COUNTY	LOCATION	AREA (acres)	WATER ORIENTED	SWIMMING	BOATING	FISHING	PICNICKING	TENT CAMPING	TRAILER CAMPING	GROUP CAMPING	REMARKS
L-38[illegible]	Bass Lake	Montcalm	6 mi. SW of Howard City	NA	x		x	x	x				
L-383	Flat River County Park	Montcalm	1 mi. S of Greenville	20					x				on Baldwin Lake
L-384	Krampe County Park	Montcalm	2 mi. NE of Coral	3	x			x	x				
L-385	Krum County Park	Montcalm	3 mi. E of Stanton	5					x				on Whitefish Lake
L-386	Schmied County Park	Montcalm	in village of Lakeview	NA					x				on Tamarack Lake
L-387	Hager Hardwood Forest	Ottawa	3 mi. N of Hudsonville	NA					x				under development
L-388	Spring Lake Trailer Park	Ottawa	in Spring Lake	NA	x		x				x		
L-389	North Beach County Park	Ottawa	2 mi W of Spring Lake	7	x	x			x				on Lake Michigan
L-390	Tunnel County Park	Ottawa	7 mi. N of Holland	17	x	x			x				Lake Michigan
L-391	Riverside	Ottawa	9 mi. E of Grand Haven	NA	x			x	x				on Grand River
L-392	Charles Binder	Calhoun	4½ mi. SE of Battle Creek	628					x	x	x		
L-393	Calhoun County Park	Calhoun	1 mi. SE of Battle Creek	5	x			x	x				
L-394	Bedford TWP Park	Calhoun	1 mi. NW of Battle Creek	1					x				
L-395	Rice Creek TWP Park	Calhoun	6½ mi. NE of Marshall	1					x				
L-396	Covert TWP Park	Van Buren	3½ mi. W of Covert	10	x	x		x		x	x		
L-397	Waverly TWP Park	Van Buren	3½ mi. NW of Paw Paw	1	x			x	x				on Shaw Lake, Sec. 21
L-398	Pine Grove TWP Park	Van Buren	1½ mi. S of Kendall	1	x	x	x	x	x				on North Lake, Sec. 34
L-399	South Haven City Park	Van Buren	in South Haven	5	x	x	x	x	x				on Lake Michigan
L-400	Maple Island Village Park	Van Buren	in Paw Paw	1	x	x	x	x	x				on Maple Lake
L-401	River Park	Eaton	NW edge of Diamondale	NA	x				x				island in Grand River
L-402	Ledges City Park	Eaton	NW edge of Grand Ledge	10	x				x	x			along the Grand River
L-403	Bennett City Park	Eaton	S edge of Charlotte	20	x				x				woodland area (memorial park)
L-404	Island Park	Eaton	in Eaton Rapids	2	x				x				island in Grand River
L-405	Memorial Park	Branch	W edge of Coldwater	62	x	x	x	x	x	x	x		on Messenger Lake
L-406	City Park & Memorial Pool	Clinton	S edge of St. Johns	[illegible]0	x	x			x				athletic field
L-407	Nottawa TWP Park	St. Joseph	3½ mi. E of Centerville	2	x	x	x	x	x	x	x		on Sand Lake
L-408	Emery County Park	Hillsdale	E edge of Hillsdale	40					x				former fish rearing pond
L-409	Hemlock County Park	Hillsdale	4½ mi. S of Allen	1	x		UNDERDEVELOPED						on Carpenter Lake
L-410	Water Works City Park	Hillsdale	1 mi. SE of Hillsdale	8	x	x			x				on Baw Beese Lake
L-411	Lake Odessa Village Park	Ionia	in Lake Odessa Village	1	x	x			x				
L-412	Bertha Brock	Ionia	2 mi. W of Ionia	185	x			x	x				playground
L-413	City Fair Ground Park	Ionia	in Ionia	10	x				x				on Grand River
L-414	Steuben County Park	Steuben	5 mi. NW of Angola	365	x	x	x	x	x	x	x		
L-415	Washington City Park	La Porte	in Michigan City	100	x	x	x	x	x				on Lake Michigan
L-416	Fox Park	La Porte	in La Porte	50					x				on Clear Lake
L-417	Stone Lake Beach	La Porte	W edge of La Porte	NA	x	x	x		x				
L-418	Soldiers Memorial Park	La Porte	in La Porte	365					x				pine forest
L-419	Lake Street Park	La Porte	in city of Gary	NA	x	x			x				
L-420	Marquette Beach	La Porte	in city of Gary	241	x	x	x	x	x				Water pollution a problem
L-421	Wells Street Beach	La Porte	[illegible] mi. E of Gary	NA	x	x			x				on Lake Michigan
L-422	Rogers City Park	Elkhart	in Goshen	10									
L-423	Shanklin City Park	Elkhart	in Goshen	30									
L-424	Wheelock City Park	St. Joseph	4 mi. N of South Bend	50	x	x	x	x	x				
L-425	Lee's Park	Lake	East Chicago	30	x	x	x		x				
L-426	Whiting Park	Lake	Whiting		x	x							
L-427	Lake Front Park	Lake	Hammond		x	x							
L-428	Otilla Hansen Park	La Porte	Michigan City, Indiana	12	x			x	x				
L-429	Krueger Memorial Park	La Porte	Michigan City, Indiana	35					x			x	

GREAT LAKES-ILLINOIS RIVER BASIN PROJECTS
RECREATION INVENTORY
LAKE MICHIGAN BASIN

LOCAL—ZONE 4

SITE NO.	NAME	COUNTY	LOCATION	AREA (acres)	WATER ORIENTED	SWIMMING	BOATING	FISHING	PICNICKING	TENT CAMPING	TRAILER CAMPING	GROUP CAMPING	REMARKS
L-430	Hessville Park	Lake	Hammond, Indiana	14	x	x		x					
L-431	Civic Center Recreation Center	Lake	Hammond, Indiana	26	x	x							
L-432	Gleason Park	Lake	Gary, Indiana	267	x	x			x				
L-433	Kosciusko Park	Lake	East Chicago, Indiana	20	x	x			x				
L-434	Lod Park	Lake	East Chicago, Indiana	48	x	x		x	x				Water pollution a problem
L-435	Washington Park	Lake	East Chicago, Indiana	17	x	x			x				
L-436	Potawatomi Park	St. Joseph	South Bend, Indiana	62	x	x			x				
L-437	Pinhook Park	St. Joseph	South Bend, Indiana	42	x	x		x	x				
L-438	Bendix Park	St. Joseph	South Bend, Indiana	39	x	x			x				
L-439	Leeper Park	St. Joseph	South Bend, Indiana	26	x			x	x				Water pollution problems
L-440	Elbel Park	St. Joseph	South Bend, Indiana	313									Water pollution a problem
L-441	Forsyth Park	Lake	Hammond, Indiana	65									Water pollution problems
L-442	Fred Rose Park	Lake	Hobart, Indiana	35	x	x	x	x	x				Water pollution problems

GREAT LAKES-ILLINOIS RIVER BASIN PROJECTS
RECREATION INVENTORY
LAKE MICHIGAN BASIN

CHICAGO LAKE FRONT

SITE NO.	NAME	COUNTY	LOCATION	AREA (acres)	WATER ORIENTED	SWIMMING	BOATING	FISHING	PICNICKING	TENT CAMPING	TRAILER CAMPING	GROUP CAMPING	REMARKS
	LOCAL												
L-443	Calumet Park	Cook	Chicago										
L-444	Rainbow Park	"	"		x	x			x				
L-445	Jackson Park	"	"		x	x	x	x	x				
L-446	Burnham Park	"	"		x	x	x	x	x				
L-447	Grant Park	"	"		x		x	x	x				
L-448	Lake Shore Park	"	"		x	x		x					
L-449	Lincoln Park	"	"		x	x	x	x	x				
L-450	Loyola Park	"	"		x	x							
L-451	Rogers Park Beach	"	"		x	x							
L-452	Lake Front Park	"	Evanston		x	x							
L-453	Gillison Park	"	Wilmette		x		x						
L-454	Elcley Lane Park	"	Winnetka		x								
L-455	Lake Front Park	"	Winnetka		x								
L-456	Lake Front Park	"	Glencoe		X								
L-457	Lake Forest Park	Lake	Lakeforest		x								
L-458	Foss Park	"	North Chicago		x								
L-459	Waukegan Beach Park	"	Waukegan		x	x							
	STATE												
S-101	Illinois Beach State Park	Lake	New Zion, Illinois	1,651	x	x			x	x	x		

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C
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STATE OF MICHIGAN
GEORGE W. ROMNEY, GOVERNOR
(seal)
WATER RESOURCES COMMISSION
Staff Offices
200 Mill Street
Tel. 373-3560

STATION B
Lansing, Michigan 48913

July 6, 1965

Mr. Roman H. Koenings
Regional Director
U. S. Department of the Interior
Lake Central Region
15 Research Drive
Ann Arbor, Michigan 48103

Dear Mr. Koenings:

Thank you for the opportunity to review the preliminary draft of your report "Water Oriented Outdoor Recreation--Lake Michigan Basin". We offer the following comments pertaining to those parts of the report which come within our field of knowledge.

I Page 3-4 Paragraph 4

> "The variation in snowfall over the state is wide, ranging from as much as 130 inches in the Upper Peninsula to about 30 inches in the lower Peninsula. Distribution of snowfall is shown graphically on Plate No. 23."

The variation in snowfall is of somewhat greater magnitude for Michigan than this statement would indicate--the range is from 160 inches to less than 30 (see Climate of Michigan, by stations, 1963--Michigan Weather Service cooperating with the Weather Bureau, U. S. Department of Commerce). This same publication also contains a map of average annual snowfall in inches, which differs from Plate 23.

II Page 3-14 Paragraph 2

In the discussion of tides and level changes on Lake Michigan--a minor technical point, there are true tides on the Great Lakes although of rather insignificant magnitude, from 1½" to 3". However, of some significance (and particularly to water recreation) are seiches. Following is a non-technical description of this common phenomena--sometimes erroneously referred to as a tidel wave, as given in our publication "Michigan and the Great Lakes."

> "The most pronounced short term changes in lake level are caused by seiches. There surface oscillations, which occur within a given time period, may be compared to water sloshing back and

forth in a bathtub. The duration of seiches varies from a few minutes to several hours. They are caused by the wind blowing in a specific direction for a long period of time or by a difference in barometric pressure. In either case, the water is forced from one end of the lake and piled up on the other. Once the wind stops blowing or the pressure changes, the water oscillates back and forth across the lake thereby causing an alternating rise and fall of levels at the lake ends. With each swing there is a little less rise or fall until the lake returns to normal.

"A seiche wave, which is a gradual rising or lowering of the water, may be observed most readily by watching the water level around piling, a dock, or pier. Occasionally these waves account for considerable change in lake level. This is true particularly in Lake Eire (because of its orientation with normal wind direction) where a rise of over eight feet has been recorded. Great damage and loss of life may result from a seiche wave. At least seven lives were lost in Chicago in 1954 when just such a wave caught many people on a pier. In 1844 a sudden wind shift resulted in a great seiche wave that caused severe damage in the city of Buffalo--many lives were lost and a great number of boats were wrecked in the harbor.

III Page 3-30 Paragraph 2

There are some inaccuracies in plate 2, insofar as Michigan rivers are concerned. For example the Thornapple River does not flow into Lansing. We would be happy to make available a drainage map of Michigan if this would be of advantage to you.

IV Page 9-13 Paragraph 2

"Plate No. 25 shows general areas where poor water quality has affected recreation". We find this statement and plate 25 most puzzling. If, as we understand, this is to suggest that poor water quality is or has been an impairing factor on any significant part of waters indicated, we must take strong exception. The implication that almost the entire lenghts of the Muskegon, Little Manistee, Escanaba, Fence and Flat rivers or substantial portions of the Pere Marquette, Menominee, and Thornapple rivers, etc., have suffered water recreation impairment, even lightly, because of poor water quality is unsubstantiated by any data available to us, and for most of the lenghts indicated is definitely in error.

We would like to discuss this topic with you and would appreciate an opportunity to review the data used to make these determinations.

With the above exceptions, the report appears to us to be accurate, adequate and very readable. We are returning the draft as requested, under separate cover.

Very truly yours,

(Signature)
Loring F. Oeming
Executive Secretary

WDM:bs
Encl.

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STATE OF INDIANA
(seal)
INDIANAPOLIS
46209
DEPARTMENT OF NATURAL RESOURCES

July 9, 1965

Mr. Roman H. Koenings, Director
B.O.R. Lake Central Region
15 Research Drive
Ann Arbor, Michigan 48103

Dear Mr. Koenings:

We have had an opportunity to review the Lake Michigan Basin Report on Water Recreation and find it acceptable as it pertains to the State of Indiana. We are herewith returning the report draft.

Thank you for the opportunity to review the preliminary publication.

Very truly yours,

(Signature)
John E. Mitchell, Director
Department of Natural Resources

JEM:UW:pw

Enclosure

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UNITED STATE DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
1405 So. Harrison Road
East Lansing, Michigan 48823

July 12, 1965

Mr. Roman H. Koenings
Regional Director
Bureau of Outdoor Recreation
15 Research Drive
Ann Arbor, Michigan 48103

Dear Mr. Koenings:

Thank you for the opportunity to review and comment on a preliminary draft of your report "Water Oriented Outdoor Recreation - Lake Michigan Basin." Several members of our staff have reviewed the draft report and we would commend your staff on the comprehensive nature of the report. We feel that the report should be very useful to all agencies and groups having an interest in recreation in the Lake Michigan Basin area. We should like to request that we be provided with a copy of the final report, if possible.

The comments that we should like to offer are of an editorial nature. They are as follows:

(1) On page 3-26, you indicate that the size of the Grand River Basin is 5,622 square miles. There are a number of other data sources which indicate that the size of the Basin is 5,572 square miles.

(2) We believe that the Thornapple River as shown on Plate 5 is improperly shown. The Thornapple River outlets into The Grand River near Grand Rapids rather than near Lansing.

Thanks again for an opportunity to review the report and we hope you will keep us in mind to receive a copy of the final report.

Sincerely,

(Signature)
Allan J. Collins
State Conservationist

Attachment

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
4601 Hammersley Road
P.O. Box 4248
Madison, Wisconsin 53711

July 13, 1965

Mr. Roman H. Koenings
Regional Director
Bureau of Outdoor Recreation
15 Research Drive
Ann Arbor, Michigan 48103

Dear Mr. Koenings:

We appreciated the opportunity to review "Water Oriented Outdoor Recreation - Lake Michigan Basin".

You have gathered together a great deal of interesting and useful inventory information. The conclusions reached appear to be sound.

We noted particularly your emphasis on the part that the private sector can play in meeting the demand for recreation. The rapid growth in private campgrounds (estimated at 300 in Wisconsin now) is testimony to the fact that the private sector can make an important contributuion when it is given some encouragement.

We believe that this report is a valuable one. If copies become available we would appreciate receiving one for our State office library.

Sincerely yours,

(Signature)
W. W. Russell
State Conservationist

(seal)

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Y (seal)

SCHOOL OF COMMERCE
THE UNIVERSITY OF WISCONSIN
Madison 53706

Commerce Building
Area Code 608

July 15, 1965

Mr. Roman H. Koenings, Regional Director
U. S. Department of the Interior
Bureau of Outdoor Recreation
15 Research Drive
Ann Arbor, Michigan 48103

Dear Mr. Koenings:

I have reviewed the draft report on "Water Oriented Outdoor Recreation" which appears to be well done; however, I would offer two criticisms: there is nothing in the supply section on hunting. Certainly water fowl hunting is an important outdoor recreational activity. I also feel that the statement on page 6-44 relative to lack of information on commercial facilities (resorts, etc.) is too strong. Maybe the information available is not completely adequate, but there certainly is a great deal more than the report implies.

I notice in the conclusion section that there are other types of studies which are suggested. We here at the University of Wisconsin would be interested in some of these if your agency plans at any point to subcontract such studies out.

Sincerely,

(Signature)
I. V. Fine
Professor of Commerce

IVF:cs

Enclosure

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U. S. ARMY ENGINEER DIVISION, NORTH CENTRAL
CORPS OF ENGINEERS
536 South Clark Street
Chicago, Illinois 60605

IN REPLY REFER TO
NCDED-B

15 July 1965

Mr. Roman H. Koenings
Regional Director
U. S. Department of the Interior
Bureau of Outdoor Recreation
Lake Central Region
15 Research Drive
Ann Arbor, Mich. 48103

Dear Mr. Koenings:

In accordance with your request of 23 June 1965 the preliminary draft of "Water Oriented Outdoor Recreation - Lake Michigan Basin" has been reviewed by our personnel.

In general the report is well written and illustrated. The subject matter is well documented and a good inventory of existing recreational facilities is presented.

Personnel of our Basin Planning Branch would like to discuss with you at your office the contents of your report in relation to the study and report to be prepared for the Upper Mississippi River area. Mr. J. S. King will contact you to arrange a mutually agreeable time for a meeting.

Thank you for giving us the opportunity to review your report. The draft copy is returned as requested.

(Signature)
E. M. FRY
Colonel, Corps of Engineers
Deputy Division Engineer

1 Incl
as stated

C
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MILWAUKEE COUNTY PARK COMMISSION
COURTHOUSE
MILWAUKEE, WISCONSIN
53233
(seal) Telephone (Area Code 414) 276-5800

July 16, 1965

Mr. Roman H. Koenings, Regional Director
United States Department of Interior
Bureau of Outdoor Recreation, Lake Central Region
15 Research Drive
Ann Arbor, Michigan 48103

Dear Mr. Koenings:

Your letter of June 24, 1964 along with your report, "Water Oriented Outdoor Recreation - Lake Michigan Basin," which was sent to Howard Gregg, was referred by him to this office for review and disposition.

Unfortunately I was on vacation and did not return to work until the early part of this week, so I was unable to give the report as close a scrutiny as I would have liked and still give my responses to you by the July 19th date. However, I have scanned the report giving particular attention to the Milwaukee County Park System references. I must compliment your office on a very thorough and comprehensive job.

On page 6-22, under the heading "The Milwaukee County Park System," it mentions 95 parks and 12 proposed park areas. Our latest figures state 108 parks and parkways, and 7 proposed parks; also our acreage is now over 12,500 acres.

I also noticed that in the section on "Rivers and Streams," (Table No. 7 and Plate 2), Oak Creek has been omitted as a tributary to the Lake Michigan Basin. I don't know if you consider this too small to qualify for distinction in the table and on the map, although I feel that it would qualify under the heading "Small Streams to the Lake."

The above were the only corrections I can make to the report, which I am returning to you under separate cover.

Sincerely,

(Signature)
Robert J. Mikula, County Landscape Architect
Milwaukee County Park Commission

RJM:hj
cc: Mr. Howard Gregg

C
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STATE OF WISCONSIN
DEPARTMENT OF RESOURCE DEVELOPMENT
Madison 2
53702

July 16, 1965

(seal)

OFFICE OF THE DIRECTOR

Roman H. Koenings
Regional Director
U. S. Department of the Interior
Bureau of Outdoor Recreation
Lake Central Region
15 Research Drive
Ann Arbor, Michigan 48103

Dear Mr. Koenings:

We're happy to have had the opportunity to review your recent report on Water Oriented Outdoor Recreation - Lake Michigan Basin.

We were particularly interested in your material and your methods used for the present and projected demand figures. Your participation rates compare favorably with the rates we will be using in our second phase recreation report; however, we would be interested in more information regarding the application of your basin participation rates to your calculated population using the Lake Michigan Basin.

Your thoughtfulness for giving us the benefit of your research is appreicated.

Very truly yours,

(Signature)
Paul A. Pratt
Director

PAP: r/d

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STATE OF WISCONSIN
(seal)
CONSERVATION DEPARTMENT
Madison 53701

July 19, 1965

Mr. Roman H. Koenings, Regional Director
Bureau of Outdoor Recreation
Lake Central Region
15 Research Drive
Ann Arbor, Michigan 48103

Dear Roman:

We received the preliminary draft of the report, "Water Oriented Outdoor Recreation - Lake Michigan Basin," sent to us for review and comment. Since our schedule did not permit all of our interested divisions to review it, I am enclosing some comments at this time and would like to forward what additional comments we may have within the next two weeks.

No comment is made upon the purpose or scope section nor on methodology or procedures. We have limited our remarks to those portions of the report where we believe additions or changes are necessary for clarification, areas where additional data is available and should be included, or where there have appeared to be significant omissions.

For ease of reference, comments are keyed to chapter and page numbers.

Upon completion of a review by others in our Department, the copy of the report will be returned to you.

Very truly yours,

(Signature)
L.P. Voigt
Conservation Director

Enc.

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(seal)
STATE OF ILLINOIS
DEPARTMENT OF CONSERVATION
Springfield

William T. Lodge
Director

August 11, 1965

Mr. Roman H. Koenings
Regional Director
U.S. Department of the Interior
Bureau of Outdoor Recreation
Lake Central Region
15 Research Drive
Ann Arbor, Michigan 48103

Dear Mr. Koenings:

Your preliminary draft report, "Water Oriented Outdoor Recreation - Lake Michigan Basin" has been reviewed by this Department.

The total report is well conceived and well written. It is without question the most comprehensive document of statistics as they relate to water oriented outdoor recreation for the Lake Michigan basin. Your staff is to be complimented for a tremendous task of research, compilation and projection.

Our only specific comment confines itself to the need for recreation land in the Illinois portion of Zone 1, particularly the need to expand Illinois Beach State Park into a continuous park from Chicago to the Wisconsin line and with acquisition of 7,500 acres or more of shoreline. We feel a necessity for greater emphasis on the importance of recreation lands in relation to the present and rapidly increasing population of the Chicago region.

At Illinois Beach, north of Waukegan, this Department now operates and maintains 1701.73 acres of state park lands with 3.5 miles of one of the best, if not the finest, beach on Lake Michigan. During the past year 50.73 acres were purchased changing the total from 1651 to 1701.73 acres. At present we are negotiating for 84.5 acres which purchase should be consummated this calendar year. Present pollution problems are non-existant or minimal. Pollution problems, however, will occur and will intensify if the above mentioned 7500 acres become occupied with private and industrial developments. This condition is imminent unless prompt action is taken to acquire the lands for park and recreation purposes. Illinois Beach State Park is an outstanding natural area, it contains sand dunes compatable with those of the proposed Indiana Dunes National Lakeshore; it contains a 768 acre nature preserve dedicated in 1964 as Illinois' first Nature Preserve. It is phenomenal to the naturalist because of its vast collection of rare specimens of plant life. The merits of the beach are already mentioned.

For many years this Department has believed the area to be of National Recreation quality and has hoped that the Bureau of Outdoor Recreation would appraise it as a National Lakeshore Recreation Area. We have experienced some frustration in the land acquisitation program for the area. The cost of shoreline lands here is approximately $2,000.00 per acre and are steadily rising. The total cost of lands needed approximates 15 million dollars. This sum, even with the availability of matching funds, is excessive for one park in a state such as ours. Appropriations for land acquisition for the State Park system have never been sufficient to transact a purchase of this magnitude.

If through in-action these lands are lost for recreational purposes, future generations will be faced with the task of construction of off-shore islands for recreational use. The cost will be gigantic and the waters will perhaps be polluted with on-shore industrial wastes.

For these reasons we hope for additional attention to recreational needs in the Lake Michigan shoreline in Illinois.

Yours very truly,

(Signature)
William T. Lodge
Director

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UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
NORTH CENTRAL REGION
710 N. Sixth Street, Milwaukee, Wisconsin 53203

IN REPLY REFER TO:
2340

August 11, 1965

Roman H. Koenings, Director
Department of Outdoor Recreation
Lake Central Region
15 Research Drive
Ann Arbor, Michigan 48103

Dear Mr. Koenings:

Enclosed is the copy of preliminary draft of the report, "Water Oriented Outdoor Recreation - Lake Michigan," sent to us for review with your letter of June 23. We apologize for being somewhat late.

We believe the report is a very good statement of the situation in the basin as it pertains to water-oriented recreation and its problems. Our comments for various sections are in the form of marginal notes and clipped sheets attached to pertinent pages.

When the report becomes available, we would appreicate receiving five copies. This will enable us to provide a copy for each Forest Supervisor headquarters within the basin.

Sincerely yours,

GEORGE S. JAMES
Regional Forester

By (Signature)
Jay Brown

Enclosure

(seal)

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  P
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(seal)
STATE OF ILLINOIS
BOARD OF ECONOMIC DEVELOPMENT
Springfield

August 16, 1965

Governor Otto Kerner
Chairman

Gene Graves
Executive Director

Mr. Roman H. Koenings
Regional Director
Lake Central Region
15 Research Drive
Ann Arbor, Michigan 48104

Dear Mr. Koenings:

Due to the complexity of the questions, the verbal comments and discussion carried on between Mr. Fisher and Mr. Besch during the latter's June 30th visit to Ann Arbor were meant to express the results of our review of the "Water Oriented Outdoor Recreation - Lake Michigan Basin".

In brief, at that time it was pointed out that there was some need for clarification of the methodology used in section 5, Demand. It appeared, from the discussion, that it was not the actual methodology, but only the ambiguity of its description that caused confusion. With that cleared up I'm sure the Demand Section will achieve the same high quality as the rest of the draft.

Sincerely,

(Signature)
Gene Graves

COPY

STATE OF MICHIGAN
GEORGE ROMNEY, GOVERNOR
(seal)
DEPARTMENT OF CONSERVATION
Stevens T. Mason Bldg.
Lansing, Michigan 48926

August 18, 1965

Mr. Roman Koenings, Regional Director
Lake Central Region
Bureau of Outdoor Recreation
3853 Research Park Drive
Ann Arbor, Michigan

Attention: Mr. Don Campbell

Dear Mr. Koenings:

We have looked over the Lake Michigan Basin report and would like to congratulate on a good job.

Attached are some rather roughly written notes indicating some suggestions for changes here and there in the text. Additional notes have been made in the manuscript itself. We hope that these may be helpful to you but remember they are only suggestions and again, we think that the report is a good one.

I am making Xerox copies of a number of pages having particularly to do with fish and with water quality in hopes the Dr. Tanner, Chief of Fish Section, will have time to review them within the next few days and perhaps send additional comments.

We would be happy to talk about any of these notes if you should like to do so.

Very truly yours,

(Signature)
William H. Colburn
Land Use Specialist
Recreation Resource Planning Section

WHC:hw

Attachment

APPENDIX D

METHODOLOGY FOR ESTIMATING DEMAND FOR RECREATION OPPORTUNITIES IN THE LAKE MICHIGAN BASIN

To facilitate the explanation of how present demand was determined, the following terms are defined:

1. Recreation Demand - the expression of people's interest in outdoor recreation opportunities.
2. Participation Rate - the number of occasions within a given time during which individuals participate in the various outdoor recreation activities as set forth in ORRRC Report No. 19.
3. Activity Day - the participation by one person in one outdoor recreation activity during all or any part of one day. Thus, one person participating in several activities during a day could account for several activity days.
4. Water Oriented Activity - an all inclusive term embracing water dependent, water enhanced and any other outdoor recreation activities in which water augments the recreational experience.
5. Water Dependent Activity - a recreation activity which could not be carried out without the use of a body of water; water being an element essential to the conduct of the activity.
6. Water Enhanced Activity - a recreation activity which is enhanced by the presence of a body of water but which can be carried out in the absence of water.
7. Principal Market Area - that region or zone from which 80 - 90 percent of the estimated participants of a basin's recreation activity could be expected to originate.

The first step in determination of the present recreation demand involved calculation of the population on which to base estimates. All Standard Metropolitan Statistical Areas (SMSA) within 125 miles of the basin were determined, along with their population as shown on Table No. 22.

Table No. 22

STANDARD METROPOLITAN STATISTICAL AREA POPULATIONS: 1960

SMSA	1960 Population
Michigan	
Ann Arbor	172,440
Bay City	170,042
Detroit - Windsor, Ontario	3,875,910
Flint	374,313
Grand Rapids	363,187
Jackson	131,994
Kalamazoo	169,712
Lansing	298,949
Muskegon	149,943
Saginaw	190,752
Wisconsin	
Kenosha	100,615
Madison	222,095
Milwaukee	1,194,290
Racine	141,781
Green Bay	125,082
Illinois	
Champaign - Urban	132,436
Chicago	6,220,913
Rockford	209,765
Indiana	
Fort Wayne	2[illegible]2,196
Hammond - Gary	573,548
Indianapolis	[illegible]97,567
Muncie	110,938
South Bend	238,614
Iowa	
Dubuque	80,048
Ohio	
Lima	103,691
Toledo	456,931
Canada[1]	
Sarnia - Port Huron, Michigan	86,635
Sault Ste. Marie - Sault Ste. Marie, Michigan	62,753

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[1] U. S. Bureau of the Census definition applied.

From information contained in the California Outdoor Recreation Study, ORRRC Report No. 4 and the report on the Comprehensive Survey of the Water Resources of the Delaware River Basin, Appendix I, it was concluded that:

1. Sixty percent of all recreation occurs within 40 miles of the participant's home.

2. Another thirty percent occurs between 40 and 125 miles of the participant's home.

3. Ten percent of all use occurs at distances greater than 125 miles.

Therefore, it was assumed that 60 percent of the population of each SMSA will recreate within a 40 mile radius of the center of it. Likewise, 30 percent of the population of each SMSA was assumed to recreate between 40 and 125 miles of the center of the SMSA. It was further assumed that recreation eminating from an SMSA will be spread equally throughout each of the zones encircling it. In order to determine that portion of the population which will affect recreation within the Basin, circles with 40 and 125 mile radii were drawn around these SMSA's and the percentage of each circle which fell within the Lake Michigan Basin was determined by planimeter as shown on Table No. 23. This percentage was then multiplied by the portion of the SMSA population represented by the circle. The resultant figures, when added to other figures, as will be indicated later, represents the population on which the demand estimates are based.

The SMSA's, which were located within the Basin, were treated in the same manner as those located outside the Basin. Their population was deleted from the total for the Basin, the circles were drawn around them, and the percentage of the circle within the Basin was used in determining the influence of the SMSA on the recreation within the Basin. Tabulation of these calculations result in a figure representing the portion of the SMSA population which affects the area under consideration. See Table No. 23. As indicated in Table No. 24, the total non-SMSA population within the Basin was added to the total SMSA population affecting recreation within the Basin to obtain the total population affecting the Basin's recreation activity. The resultant figure becomes the basic number upon which the demand estimates were based.

In planimetering, the various figures, water as well as land areas, were included. It was assumed when a natural barrier, such as Lake Michigan, was encountered, people would spread with greater intensity along the edge of it.

Table No. 23

PERCENTAGE OF EACH STANDARD METROPOLITAN STATISTICAL AREA'S ZONAL AREA FALLING WITHIN THE LAKE MICHIGAN BASIN

State - SMSA	40 Mile Zone	40-125 Mile Zone
Michigan		
Ann Arbor	20.0	25.6
Bay City	--	35.0
Detroit	--	16.0
Flint	13.0	28.9
Grand Rapids	100.0	68.0
Jackson	53.2	31.2
Kalamazoo	100.0	48.8
Lansing	78.7	40.4
Muskegon	100.0	79.3
Saginaw	5.2	36.4
Wisconsin		
Kenosha	58.6	50.2
Madison	6.0	34.0
Milwaukee	65.3	59.3
Racine	61.7	55.3
Green Bay	100.0	71.7
Illinois		
Champaign - Urbana	--	1.9
Chicago	45.4	33.9
Rockford	--	27.6
Indiana		
Fort Wayne	13.5	26.7
Hammond - Gary	39.6	32.6
Indianapolis	--	1.4
Muncie	--	7.3
South Bend	63.8	41.6
Iowa		
Dubuque	--	2.4
Ohio		
Lima	--	10.7
Toledo	--	19.6
Canada[1]		
Sarnia - Port Huron, Michigan	--	6.7
Sault Ste. Marie - Sault Ste. Marie, Michigan	--	18.5

[1] U. S. Bureau of the Census definition applied.

Table No.24

EFFECTIVE POPULATION INFLUENCING THE LAKE MICHIGAN BASIN

State - SMSA	40 Mile Zone	+	40 - 125 Mile Zone	=	Total	% SMSA Population
Michigan						
Ann Arbor	20,693	+	13,278	=	33,791	19.6
Bay City	0	+	17,854	=	17,854	10.5
Detroit - Windsor, Ont.	0	+	186,043	=	186,043	4.8
Flint	29,196	+	32,565	=	61,761	16.5
Grand Rapids	217,912	+	74,090	=	292,002	80.4
Jackson	42,106	+	12,407	=	54,513	41.3
Kalamazoo	101,827	+	24,778	=	126,605	74.6
Lansing	141,104	+	36,173	=	177,277	59.3
Muskegon	89,966	+	35,686	=	125,652	83.8
Saginaw	59,514	+	20,792	=	80,306	42.1
Total					1,155,804	
Wisconsin						
Kenosha	35,376	+	15,153	=	50,529	50.2
Madison	7,995	+	22,654	=	30,649	13.8
Milwaukee	468,162	+	212,584	=	680,746	57.0
Racine	52,459	+	23,521	=	75,980	53.6
Green Bay	75,049	+	26,905	=	101,954	81.5
					939,858	
Illinois						
Champaign - Urbana	0	+	775	=	755	0.6
Chicago	1,694,577	+	632,667	=	2,327,244	37.4
Rockford	0	+	17,369	=	17,369	8.3
					2,345,368	

Table No. 24 (con.)

State-SMSA	40 Mile Zone	+	40 - 125 Mile Zone	=	Total	% SMSA Population
Indiana						
Fort Wayne	18,808	+	18,599	=	37,407	16.1
Hammond - Gary	136,275	+	56,093	=	192,368	33.5
Indianapolis	0	+	2,930	=	2,930	0.4
Muncie	0	+	2,430	=	2,430	2.2
South Bend	91,341	+	29,779	=	121,120	50.7
					356,255	
Iowa						
Dubuque	0	+	576	=	576	0.7
					576	
Ohio						
Lima	0	+	3,328	=	3,328	3.2
Toledo	0	+	26,868	=	26,868	5.9
					30,196	
Canada						
Sarnia - Port Huron, Michigan	0	+	1,741	=	1,741	2.0
Sault Ste. Marie - Sault Ste. Marie, Michigan	0	+	3,483	=	3,483	5.6
					5,224	
	SUMMARY					
	Total of all SMSA's			=	4,833,281	
	Remaining non-SMSA population in Basin				1,812,285	
	Total population influencing the Lake Michigan Basin				6,645,566	

Participation rates for selected outdoor recreation activities were determined from ORRRC Report No. 19, Tables No. 1.01, 2.01, 3.01 and 4.01. These rates were adjusted to the Basin by multiplying them by the ratio of Basin per capita income to North Central Census Region per capita income. This adjustment was made to reflect more localized conditions in rates of participation in the various outdoor recreation activities. The ratio of Basin per capita income to North Central Census Region per capita income is used as a basis of adjustment since per capita demand bears close relationship to a person's available income. According to information contained in ORRRC Report No. 26, 85 percent of the variation in participation is traceable to variation in per capita income. The North Central Census Region 1960 per capita income of $2,228 was divided into the 1960 Basin per capita income of $2,324 to obtain the factor of 1.04 used to adjust the participation rates to local conditions. See Table No. 9. The population influencing recreation participation as previously determined is multiplied by the adjusted participation rates to yield activity days of participation. This, then, becomes current recreation demand by activity as shown on Table No. 9. It is recognized that the Basin, being a popular vacationland, is subject to considerable influx by non-resident vacationers and residents of Michigan or Wisconsin, living outside the Basin, who vacation or recreate in the Basin. The Basin's principal market area covers Ohio, Indiana, Illinois, Michigan and Wisconsin, or those states within one day's drive. This is a market of some 40 million potential customers as portrayed on Plate No. 3. These visitors contribute significantly to the total recreation use. While the majority of the people living in the market area are reflected in the effective population previously determined it is realized the non-SMSA population outside the Basin but within the 125 mile zone of the Basin are not. It was assumed the number of non-SMSA people outside the Basin who influence recreation in it would be cancelled out by the non-SMSA people within the Basin who do not influence recreational activity within it.

One other group not reflected in the determination of the effective population are those who come into the Basin from distances greater than 125 miles for extended vacations. No valid method of including this portion of the recreation activity could be determined, however, it is felt that it is significant. Therefore, the activity days as determined for the various activities are no doubt conservative.

Table No. 9

PRESENT DEMAND FOR SELECTED WATER ORIENTED OUTDOOR RECREATION ACTIVITIES LAKE MICHIGAN BASIN

Activity	Annual Participation Rate ORRRC	Summer Participation Rate ORRRC	Annual Basin Adjusted Rate	Summer Basin Adjusted Rate	Annual Activity Days 1,000's	Summer Activity Days 1,000's
Water Dependent Activities						
Swimming	5.34	4.63	5.56	4.82	36,949	32,032
Fishing	4.01	2.05	4.17	2.13	19,000[1]	9,700[2]
Boating (General)	2.21	1.48	2.30	1.54	15,285	10,234
Water Skiing	.27	.21	.28	.22	1,861	1,462
Canoeing	.13	.07	.14	.07	930	465
Sailing	.07	.05	.07	.05	465	332
Sub-Total (Water Dependent Activity Days)					74,490	54,225
Water Enhanced Activities						
Camping	.65	.40	.68	.42	4,519	2,791
Picnicking	3.64	2.34	3.79	2.44	25,187	16,215
Sightseeing	6.64	2.71	6.91	2.82	45,921	18,740
Nature Walks	2.42	.60	2.52	.62	16,747	4,120

Table No. 9 (con.)

Activity	Annual Participation Rate ORRRC	Summer Participation Rate ORRRC	Annual Basin Adjusted Rate	Summer Basin Adjusted Rate	Annual Activity Days 1,000's	Summer Activity Days 1,000's
Water Enhanced Activities (con.)						
Hiking	.35	.21	.36	.22	2,392	1,462
Sub Total (Water Enhanced Activity Days)					94,766	43,328
Winter Sports Activities						
Ice Skating	.99	--	1.03	--	6,845	
Snow Skiing	.07	--	.07	--	465	
Sledding	.46	--	.49	--	3,256	
Sub-Total (Winter Sports Activity Days)					10,566	
Grand Total (Water Oriented Activity Days)					179,822	97,553

1/ Figure is based on information furnished by the Bureau of Sport Fisheries and Wildlife in accordance with Section 2C of the Memorandum of Understanding of February 3, 1965 between the Bureau of Outdoor Recreation and the Bureau of Sport Fisheries and Wildlife and was not calculated in the same manner as other figures.

2/ Figure was calculated using the proportion; annual participation rate (adjusted) is to Summer participation rate (adjusted) as Annual fishing activity days are to Summer fishing activity days.